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GENERAL ARTICLES

TUBERCULOUS MENINGITIS

SOME EXPERIENCES BASED ON THE TREATMENT OF 140 CASES*

By W. L. CALNAN

From the Whittington Hospital, London

Introduction

EXPERIENCE in the treatment of tuberculous meningitis with streptomycin is now worldwide. All observers are agreed that the previous course of the disease has been altered, but opinions differ regarding the extent of success. At Cocchi's clinic in Florence the mortality is reported to have been reduced to less than 25 per cent. (Flori, 1950). In contrast, some medical opinion in the United States and Canada seems to consider streptomycin treatment hardly worthwhile, and more effective chemotherapeutic agents are awaited (Shamaskin *et al.*, 1949; Brainerd and Eagle, 1950).

This paper is an account of some of our findings during the treatment of 140 patients with tuberculous meningitis. These patients have been treated in a special unit which was established at this hospital in July 1947, under the auspices of the Medical Research Council. Certain etiological features, including the history of exposure, some points in diagnosis, the radiological findings, the development of the present streptomycin treatment régime, the results, and some of the sequelæ encountered, will be considered.

AGE INCIDENCE

The age distribution of the patients in the series is shown in Fig. 1 (*a*). The unit was established for the treatment of children, and, except for fifteen patients, all were under the age of 15 years.

This age distribution is similar to that obtaining over the country as a whole. Fifty-one, or 36 per cent., were under 3 years of age. The youngest child was seven weeks old at the time of onset of the disease. There was no significant difference in the sex incidence.

* Based on a paper read before the meeting of the North-west Metropolitan Regional Tuberculosis Society on March 21, 1951.

SEASONAL INCIDENCE

A clinical impression had been obtained that the disease occurred more frequently in February, March and April. The monthly figures from the

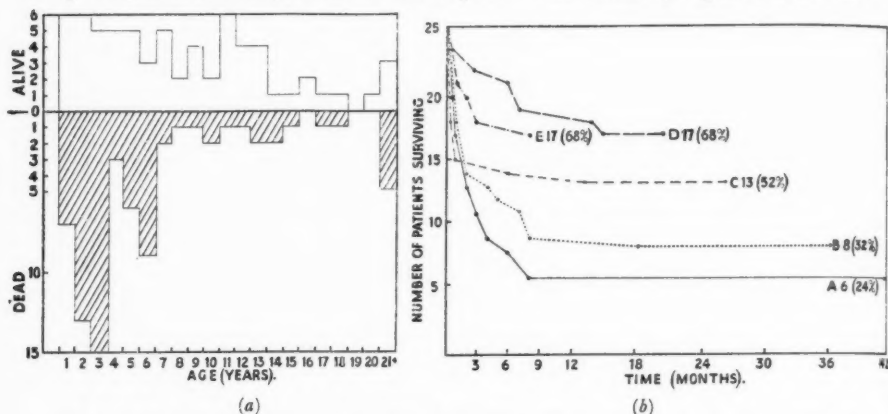


FIG. 1.—(a) AGE DISTRIBUTION OF 140 PATIENTS. (b) SURVIVAL RATE IN SUCCESSIVE GROUPS (A TO E) OF 25 PATIENTS.

unit are too small for analysis, but this impression is confirmed by an examination of the figures for the total number of deaths each month from tuberculous meningitis in England and Wales in 1945-7 (Fig. 2).

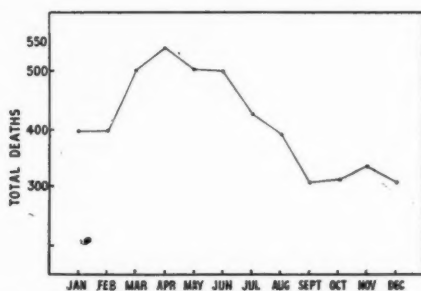


FIG. 2.—TOTAL DEATHS EACH MONTH FROM TUBERCULOUS MENINGITIS IN ENGLAND AND WALES IN 1945-7.

Death usually ensues, in default of treatment, approximately three weeks after the onset of the disease. Attention has recently been drawn to this seasonal incidence by Hall (1950), who has suggested some possible reasons for the spring peak. Exposure to infection at Christmas, resulting from the "gathering of the clans," seems likely. Whatever the cause, we should be particularly on the look-out for fresh cases in the spring and make such additional arrangements for accommodation in units and hospitals as may be necessary.

HISTORY OF EXPOSURE

Before considering the figures for exposure to infection and a family history of tuberculosis, the practice in the unit for obtaining such information will be described. The number of cases in which a positive history is obtained will depend to a large extent on the enthusiasm and determination of the investigator, and what facilities are available. A detailed history of any possible contact is obtained from the parents, and both parents and any other children are asked to submit to a radiological examination of the chest at the hospital, if this has not recently been carried out elsewhere. Any other suspected contact, such as a lodger, is also persuaded if possible to submit to such examination. Examination of any other members of the household is left to the chest clinic physician following notification of the case of meningitis. Unfortunately, any fresh contact thus discovered is not always notified to us, so that the figures given may be incomplete.

The relevant data are shown in Table I. The source of contact was previously known to be tuberculous in fifty cases (36%). This figure may be considered high, but no criticism of public health workers or chest clinic physicians is intended or implied. In some instances the "contact" refused treatment or disregarded advice. In others, segregation was impossible owing to the inadequacy of local facilities, particularly housing. Moreover, no contact could be traced in eighty cases (57%).

TABLE I

	<i>Age Group</i>	<i>Number</i>	<i>Per Cent.</i>
No contact found	under 3 yrs. over 3 yrs.	19 } 80 61 }	13 } 57 44 }
Source of infection previously known	under 3 yrs. over 3 yrs.	28 } 50 22 }	20 } 36 16 }
Fresh contact found	under 3 yrs. over 3 yrs.	7 } 10 3 }	7
		140	100
Family history of tuberculosis, but no history of exposure		25	18
Previously known to be tuberculous (no contact found in eleven cases)		26	19

Twenty-six patients were previously known to have had their first tuberculous infection prior to the recent onset of meningitis. Many of these children came from sanatoria where they were under treatment for pulmonary or bony tuberculosis. No history of contact was found in eleven of these patients.

A history of tuberculosis in some other blood relation without contact was obtained in twenty-five patients (18%). It is impossible to evaluate the significance of this figure without some controls for the general population, but it raises the question of the part played by genetic factors in tuberculosis.

It is sometimes stated that the finding of miliary or meningeal tuberculosis in the young child presupposes the existence of open tuberculosis in the house-

hold. With the methods of investigation which have been described, ten fresh cases of pulmonary tuberculosis were found in relatives of children admitted to the unit.

To summarise, then, seventy-one or 50 per cent. of the 140 patients were previously known to be tuberculous or were found later to have been exposed to a source of infection.

No mention has so far been made of bovine infection. The majority of the children treated have come from urban areas, but it is appreciated that bovine tuberculous infection may have been the source in some of the remainder. It has not been possible, however, to obtain any information on this matter.

POSSIBLE PRECIPITATING FACTORS

Certain conditions, notably the infectious fevers, are sometimes said to precipitate generalised dissemination of tuberculosis in children. Questioning revealed the following in this series. All occurred within two months of the onset of tuberculous meningitis.

	Cases
Measles	18
Trauma (to the head)	8
Whooping cough	6
Tonsillitis, chicken pox and respiratory infection (each) ..	2
Mumps, infective hepatitis and acute appendicitis (each) ..	1

Diagnosis

Today, the early diagnosis of this disease becomes of paramount importance if we are to take full advantage of the recent introduction of effective chemotherapy. Many excellent accounts of the early clinical picture have been published during the past three years. It is unnecessary here to do more than mention a few points which appear to have special significance.

It is essential to realise that tuberculous meningitis may be present in the absence of any physical signs of meningitis, and sometimes even without symptoms. Most of us have seen at least one patient with miliary tuberculosis, sometimes with relatively little evidence of toxæmia, in whom a diagnostic lumbar puncture before starting treatment has disclosed evidence of an associated meningitis. That being so, our approach should be—and the question should constantly be in our minds—"Could this patient possibly have tuberculous meningitis?" The question is doubly important to chest clinic physicians, being in daily contact with patients suffering from active tuberculosis. More than once a doctor has said, "Such a possibility never entered my head." "If you don't think of it, you won't diagnose it," is a medical axiom which can be applied to some well-known conditions as well as to the rarities.

The importance of a diagnostic lumbar puncture must be stressed in all patients with miliary tuberculosis, both before, and at regular intervals during, treatment with streptomycin. Punctures should be done at least once a month, and preferably every week, particularly during the first three months. While recovery may occur in patients with tuberculous meningitis treated with intramuscular streptomycin alone—we have had two such cases in the unit—the results are generally bad, and intrathecal treatment should be given at

the first sign of meningitis, whether clinical or pathological. Symptoms of meningitis may not appear during intramuscular streptomycin therapy. A boy of seven years, at present in the unit, was treated for six months with intramuscular streptomycin for miliary tuberculosis. Within three weeks of the end of treatment, symptoms of meningitis developed and examination of the cerebro-spinal fluid proved the diagnosis. No earlier lumbar puncture had been done.

A tuberculin test should be carried out in all children who show the early vague and indefinite symptoms. If these symptoms persist for more than a week, there should be no hesitation in proceeding to chest radiography and lumbar puncture.

Of the more constant signs, fever and the mental apathy on which so much stress has been rightly laid by many authors are particularly significant. It is unnecessary to enlarge on the more classical signs of meningeal irritation such as headache, vomiting, fits, squints, neck stiffness and a positive Kernig's sign.

While the majority of children show the characteristic symptoms with insidious onset, the onset may be sudden and dramatic. A convulsion was the first and only sign in one child; lumbar puncture showed the cerebro-spinal fluid changes of tuberculous meningitis. In another child, the cerebro-spinal fluid was normal on the day a convulsion occurred, but changes were present when the fluid was examined six days later.

Criticism for delay tends to fall all too easily on the general practitioner, but hospital medical staffs have also been guilty of serious delays, and it is appreciated that the general practitioner's task is the most difficult one.

Thus, while the early diagnosis of tuberculous meningitis is one of the most difficult medical problems, we can improve the present position by bearing the condition constantly in mind, instituting tuberculin testing early, and following this up with chest X-ray and lumbar puncture when no clinical improvement occurs.

THE MANTOUX TEST

The Mantoux test is carried out in all children who are admitted to the unit, and was positive in all except three of those who survived long enough for it to be completed.

The 1 in 1,000 dilution is the most useful from a diagnostic point of view.

TABLE II.—CHEST X-RAY FINDINGS

	Total	Per Cent.	Mortality
Miliary	31	22	(14) 45%
Primary complex (uncomplicated) ..	57	41	(31) 55%
Nil	41	29	(23) 56%
Post-primary infiltration	5	3.8	(2) 40%
Lobar collapse	4	2.8	(3) 75%
Pleural effusion	2	1.4	(1) 50%
	140	100	

The cerebro-spinal fluid shows a lymphocytosis, with an elevation of the protein level, and reduction in the sugar content. The chlorides levels are

often reduced, but are unreliable. A normal sugar content does not exclude the diagnosis. While one of these values may be within the normal range, successive examinations will show the characteristic values. Prolonged search for acid-fast bacilli is rewarded in most cases, provided 10-20 ml. of C.S.F. are used and spinning in a high-speed centrifuge for half an hour is employed.

Chest X-ray.—The results of chest X-ray in the 140 cases in the series are shown in Table II. Contrary to some published reports, the prognosis has not been worse in patients with radiological evidence of miliary tuberculosis.

Treatment

It is unnecessary, and even inadvisable, to delay the start of treatment until tubercle bacilli have been isolated from the C.S.F. Treatment can be started at once in a child presenting the characteristic clinical picture and C.S.F. changes. The association of a lymphocytosis with a low sugar content of the fluid is found in no other condition, except a few cases of neurovascular syphilis, epidural abscess, and torulosis of the nervous system. As much C.S.F. as possible should be taken for Lowenstein culture during the first week. It is very unwise to start intramuscular treatment alone while waiting for tubercle bacilli to be isolated from the C.S.F. Once the decision to give streptomycin treatment has been taken, the combined intramuscular and intrathecal routes must be used.

The rhythm or régime of streptomycin treatment has been developed in four phases. These will be referred to as Plans A, B, C and D.

Plan A

Alternate patients received intramuscular streptomycin only, and the remainder received the drug by the combined intrathecal and intramuscular routes. The first twenty-five patients were thus treated. This treatment was carried out at the request of the Medical Research Council, and twenty-three of the patients were included in the Medical Research Council Report (1948). The period of treatment given was that shown in Plan B (Fig. 3).

Plan B

All patients in this group were given combined intrathecal and intramuscular streptomycin according to a specific course, which covered a period of five months (Fig. 2).

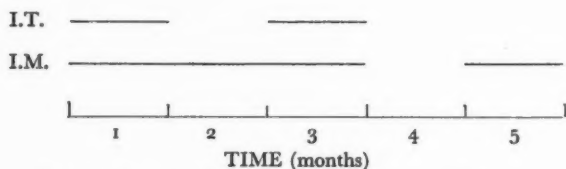


FIG. 3.—STANDARD COURSE OF STREPTOMYCIN TREATMENT

Further periods of treatment were given if indicated by deterioration or relapse.

Plan C. The Transition Period

The period of intrathecal treatment was gradually prolonged, avoiding rest periods, and the period of intramuscular treatment was also lengthened until recovery was virtually complete. During this period we were trying to find criteria by which we could control the length of treatment in the individual patient.

Plan D. The Recent Scheme of Treatment

Each patient is treated individually according to the clinical response and until the cerebro-spinal fluid is considered "satisfactory" (see below).

Intramuscular streptomycin is given for a minimum period of six months or until the cerebro-spinal fluid is normal (whichever is the longer period).

Intrathecal streptomycin is given until all the following criteria have been satisfied:

1. The patient is clinically well—i.e., free of symptoms, gaining weight, and without abnormal signs in the nervous system (except irreversible lesions such as hemiplegia, blindness or deafness).
2. The temperature is below 99°F.
3. Six weeks have elapsed since the last occasion on which tubercle bacilli were detected in the C.S.F.
4. The C.S.F. is "satisfactory"—i.e., cell count below 100 per cu. mm., protein below 200 mgm. per cent. and falling, and glucose over 40 mgm. per cent.

Intrathecal treatment is resumed if:

1. Clinical symptoms or signs of activity reappear.
2. The C.S.F. glucose level falls below 30 mgm. per cent. on two successive occasions.
3. Tubercle bacilli are again isolated from the C.S.F.

The same original criteria for stopping intrathecal treatment are required for a relapse. This scheme of treatment is not made a hard-and-fast rule, and variations may be made in particular patients.

The "course" of treatment in Plan B was suggested arbitrarily, and we were quite prepared to modify it if necessary. At the same time, it was felt that a sufficiently large number of patients should be treated according to a particular plan in which the number of variable factors was kept to a minimum. Only in this way could the results of the method be properly evaluated.

Considerable advances have been made by the commercial manufacturing chemists in the purification of streptomycin, and the preparations at present available rarely cause any appreciable irritation when injected intrathecally in therapeutic doses. When intrathecal treatment is continued for longer than four weeks, many of the patients begin to improve, signs of meningeal irritation subside, and the older children begin to sit up in bed and take a positive interest in their surroundings, in spite of continued intrathecal injections. Moreover, clinical relapses, and the re-appearance of tubercle bacilli in the cerebro-spinal fluid, have virtually been eliminated. It was considered therefore, that the continued treatment was beneficial. The rising incidence

of deafness, however, to which I shall refer later, has been the most disappointing feature of the increased survival rate, which I consider to be largely a reflection of this more prolonged treatment.

The daily intramuscular dosage of streptomycin has been the same as originally recommended—namely 20 mgm. per lb. body weight up to a maximum of 2 grams, given in four equally divided doses until April 1950 and in two equally divided doses since that date. The daily intrathecal dose has been 100 mgm. for all patients up to April 1950, when it was reduced to 50 mgm.

Twenty-four patients have received sulphatrone intrathecally as part of a controlled trial of this drug in addition to streptomycin, but without any advantage in survival rate (Calnan *et al.*, 1951 b).

Thus it will be seen that the alterations of the treatment régime have been to effect a change over from treating patients according to a standard "course," to controlling the length of streptomycin treatment by the particular response in each individual patient. One patient may require six weeks' intrathecal treatment, while another requires six months.

VENTRICULAR DRAINAGE

Tapping of the lateral ventricles has been practised with increasing frequency, and it is essential to have facilities available for making burr holes in the skull. It may be a life-saving procedure in an attack of acute hydrocephalus, and it provides an alternative route for the administration of streptomycin in the presence of spinal block.

One aspect of treatment which we consider to be very important in this long chronic illness is the discussion of the child's illness with the parents. Once the decision to start treatment has been made, the parents should be told of their child's illness, particularly its tuberculous nature, and that treatment, if successful, will be long—a minimum of six months and perhaps eighteen months. Their anxiety during the early weeks is considerable, and they need moral encouragement. It is extremely difficult to foretell the outcome in the individual patient, and the prognosis should be guarded but hopeful. We have received excellent co-operation from all the parents here, and treatment has never been refused.

The nursing of these children is very onerous. Some of them lie in bed in an apathetic immobile state for months. Daily lumbar punctures, urinary incontinence, and the ever-present threat of pressure sores, and often spoon and tube feeding, all impose a very heavy burden on the nursing staff. Occupational therapy and schooling are of great value in convalescence. We have been fortunate in having the co-operation of the London County Council in obtaining the services of three teachers and one for deaf children.

Results

The results of treatment in 114 patients are shown in Table III. The findings in the first fifty-four patients have been previously reported (Rubie and Mohun, 1949; Calnan *et al.*, 1951 a). Only patients with a minimum of twelve months' potential observation have been considered.

TABLE III.—RESULTS OF TREATMENT (114 PATIENTS)
(Minimum observation period one year)

Group	Total	Deaths. % of 114 Patients	Mortality (%) in each Group
Under 3 years	34 (30%)	25 (22%)	73
Over 3 years	80 (70%)	36 (31%)	45
Early ..	36 (31%)	12 (10%)	33
Middle ..	50 (44%)	24 (21%)	48
Advanced ..	28 (25%)	25 (22%)	89

The classification of cases into Early, Middle and Advanced was the same as recommended by the Medical Research Council (1948).

Fig. 4 shows how the survival rate falls, steeply at first, during the year before reaching a stabilised level. An occasional death may occur even after twelve months.

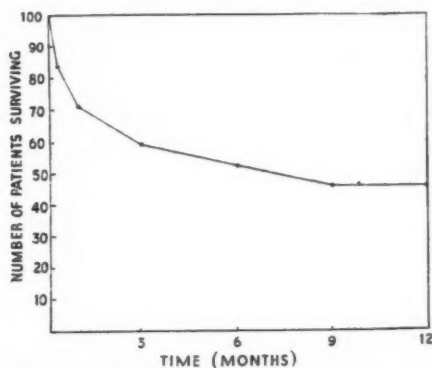


FIG. 4.—FALL IN SURVIVAL RATE OF 100 PATIENTS DURING TWELVE MONTHS

The overall survival rate does not show how the results have been improved. This is shown in Chart I(b), where the survival rate in successive groups of twenty-five patients is seen and where the survival rate has been increased from 24 per cent. to 68 per cent.

In our experience, the results are worse in the younger age-group—i.e., children under 3 years of age—although it will be noticed that six out of thirteen infants under one year of age have survived (Fig. 1).

Streptomycin-resistant strains of tubercle bacilli have rarely been isolated, even on relapse. Tubercle bacilli were isolated in twenty-two of the first 115 patients one month or more after the start of streptomycin treatment. Significant resistance (more than 100-fold) was encountered in three cases. Tubercle bacilli isolated from one other patient within two weeks of the start of treatment showed 1,000-fold resistance. One patient with a resistant strain has survived.

We consider that inaccessibility of the tubercle bacilli to the drug is a more important factor than drug resistance in tuberculous meningitis.

Sequelæ

The following sequelæ have been encountered:

Deafness	.. .. .	15
Retarded development (all under 3 years of age)	.. .. .	6
Hemiplegia (minimal disability in one child who attends a normal school)	.. .. .	2
Hemiplegia and homonymous hemianopia	.. .. .	2
Blindness	.. .. .	1
Mental defect	.. .. .	2

Deafness only will be mentioned here. While it is known that deafness may be caused by the meningitis itself, it has been more frequent since the prolongation of streptomycin treatment, and particularly intrathecal treatment.

Table IV shows the relationship of deafness to the duration of intrathecal treatment in a recent series of forty-eight consecutive admissions, who have been observed for at least six months.

TABLE IV.—DETAILS OF INCIDENCE OF DEAFNESS IN RELATION TO LENGTH OF INTRATHECAL TREATMENT

<i>Number of weeks of I.T. treatment</i>	<i>Number of patients given I.T. treatment</i>	<i>Number of patients at risk</i>	<i>% of patients at risk</i>	<i>Died</i>	<i>Deaf</i>	<i>% deaf of patients at risk</i>
1	2	46	96	2		
2	3	43	90	3		
3						
4						
5	1	42	87.5	1		
6	1	41	85	1		
7	2	40	83	1	1	2.5
8	7	39	81	1		
9	2	38	79	1		
10	2	37	77	1		
11						
12	3	36	75	1	1	5.5
13						
14	2				1	8.3
15	4				2	13.9
16	2				1	16.6
17	2				1	19.5
18	2				1	22.5
19	1					
20	2	35	73	1		
21	2				1	25.7
22						
23						
24						
25	3					
26	2	34	71	1		
27						
28	1				1	29.4
29						
30	2	34	71			
<i>Total</i>	48	48	100%	14	10	29.4%

In our opinion, the majority of the deaf children would not have survived if their period of streptomycin treatment had been appreciably shortened.

Deafness must probably be regarded as the price these children have to pay for survival. No patient who became deaf has subsequently died. A detailed account of the otological aspects of this type of deafness has been given by Walker (1951).

With the prolonged streptomycin treatment employed here, we have been able to reduce the mortality in this disease to 32 per cent. It is possible that we have swung the pendulum too far, and are now "over-treating" our patients. Attempts are being made to shorten the period of intrathecal treatment to less than three months without incurring any undue risk of relapse. It is possible that the intrathecal use of tuberculin as an adjuvant to streptomycin will enable this to be done.

After-treatment

When streptomycin treatment is completed and the cerebro-spinal fluid is normal or approaching normal, there still remains the need for further supervision.

1. These children should, ideally, have a period of convalescence in a sanatorium.
2. Pulmonary and other extra-meningeal manifestations of tuberculosis may require particular treatment.
3. Lumbar punctures should be carried out at regular intervals for at least a year to ensure the early detection of relapse. In the present state of our knowledge, we are not in a position to say any child has been "cured."
4. Social re-adjustment is sometimes necessary after prolonged hospitalisation.
5. Special schooling, particularly for the deaf children, may be required.

Conclusions

What can be expected in the future? Some hopes and possibilities may be mentioned:

1. Our ideal is to prevent rather than cure this disease. Better segregation of children from open cases of tuberculosis and B.C.G. vaccination offer good prospects of success.
2. Newer antibiotics and chemotherapeutic agents are needed.
3. Among the problems which remain to be investigated are the eighth nerve toxic disturbances, and the evaluation of intrathecal tuberculin. Such problems are best studied in special centres supplied with an adequate number of patients for statistical analysis. The behaviour of tuberculous meningitis under treatment is so variable in particular patients that few firm conclusions can be drawn from the individual case.

Considerable laboratory work is necessary in the control of treatment. In concluding, it is a pleasure to acknowledge the help we have received from Dr. J. M. Alston, Dr. A. F. Mohun and the staff of the Archway Group Laboratory. I would like to thank Dr. Simon Yudkin for his help, and particularly in preparing this paper. My thanks are also due to Dr. J. Rubie,

who had charge of the unit until March 1949, for allowing me the full benefit of his experience. The skill and care shown by Sister S. E. Robinson and the nursing staff have been of the highest standard, and I am very grateful for their help.

BIBLIOGRAPHY

- BRAINERD, H. D., and EAGLE, H. R. (1950): *Ann. intern. Med.*, **33**, 397.
CALNAN, W. L., RUBIE, J., and MOHUN, A. F. (1951a): *Brit. Med. J.*, **1**, 792.
CALNAN, W. L., RUBIE, J., and MOHUN, A. F. (1951b): *Brit. Med. J.*, **1**, 794.
FLORI, A. G. (1950): *Pædiatrics*, **6**, 391.
HALL, S. (1950): *Tubercle, Lond.*, **31**, 241.
MEDICAL RESEARCH COUNCIL (1948): *Lancet*, **1**, 582.
RUBIE, J., and MOHUN, A. F. (1949): *Brit. Med. J.*, **1**, 338.
SHAMASKIN, A., DES AUTELS, E. J., SWEANY, H. C., MORRIS, L. C., ZVETINA, J. R., and
MINDLIN, J. (1949): *Dis. Chest*, **16**, 765.
WALKER, A. S. (1951): In the press.
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A working man has no time to be an "early case" of pulmonary tuberculosis.

SIR JAMES KINGSTON FOWLER: *Problems in Tuberculosis*, London, 1923, p. 60.

Ninthly, This Disease is also propagated by Infection. For this Distemper, (as I have observed by frequent Experience) like a contagious Fever, does infect those that lie with the sic Person with a certain Taint.

RICHARD MORTON: *Phthisiologia: or, a Treatise of Consumptions*, London, 1720, p. 67.

FRIEDLÄNDER PNEUMONIA

A REPORT OF EIGHT CASES TREATED BY CHEMO-THERAPY

By A. G. OGILVIE

From the Royal Victoria Infirmary, Newcastle-on-Tyne

DURING the course of the year 1949 it became obvious that among the cases of pneumonia admitted to my clinic of forty beds there was an unusual prevalence of infection due to the pneumo-bacillus of Friedländer. This organism was cultured in the sputum of no less than 20 of 48 admissions during that year.

Of these 20, the pneumo-bacillus was grown in pure culture or was the obviously predominant organism in 7, whereas in the remaining 13 the culture was a mixed one and the growth of Friedländer's organism was relatively scanty.

Perlman and Bullowa (1941), among others, have pointed out that this bacterium is a frequent contaminant of the sputum, and Cecil gives the incidence as from 2 per cent. to 25 per cent. of normal persons. The incidence in broncho-pulmonary infections also varies widely, and my experience over the past three years is as follows: of 140 cases, Friedländer's bacillus was cultured in the sputum in 31, or 22.3 per cent. This incidence is, of course, by no means the same thing as the incidence of Friedländer's pneumonia, which is a fairly well accepted clinical, pathological and bacteriological entity.

Perlman and Bullowa in their well-known review found a general incidence of 0.5 per cent. to 2 per cent. of all pneumonias.

Of the 31 cases of pneumonia in which Friedländer's pneumo-bacillus was found, 23 yielded a mixed growth, and all responded promptly to penicillin treatment. The remaining 8 in which the pneumo-bacillus was predominant in the sputum, and of whom only 1 responded to penicillin, were regarded as examples of Friedländer's pneumonia. They occurred in a total of 140 pneumonias admitted in three years into the wards of a medical clinic of forty beds. This is an incidence of 5.7 per cent which is very high, but it is fairly obvious that this is due to an unusually high figure for the year 1949. In actual fact, all the 8 cases were admitted between January 1, 1949, and January 31, 1950. A larger series would no doubt show a greatly reduced incidence.

The diagnosis of Friedländer pneumonia was based on a pure or predominant culture of the organism in the sputum, the serious nature of the illness clinically, its failure to respond to penicillin in full dosage, except in one case, and the prompt response to streptomycin in the six survivors who were so treated. In one patient the strain of pneumo-bacillus isolated was partially sensitive to penicillin, and the illness was cured by the use of large doses.

Two patients died, both after apparent response to streptomycin. This fact emphasises the serious character of the disease, as, apart from those in whom the pneumonia was either the terminal incident or the final complication of a severe and prolonged period of invalidism, only 8 other patients have died

from pneumonia in the wards concerned during the three years under review, out of a total of 140, and of these 8, 3 suffered from serious associated disease.

Nevertheless, as is well known, the mortality was much higher in former years. Of Bhatnagar and Singh's (1935) 13 cases, only 1 survived, and only 6 of the 37 reviewed by Perlman and Bullowa (1941). Felson *et al.* (1949) reported 16 cases with 14 deaths.

It is for this reason, and also because relatively few cases treated with streptomycin have been described, that these additional 7 examples, together with 1 cured by penicillin alone, are reported.

Nataro, Shapiro and Gordon (September 1950), recording 4 cases of their own treated by streptomycin, were only able to collect from the literature 10 others similarly treated. They also claimed the first published cure with aureomycin.

CASE 1.—Male, æt. 59. Admitted after four weeks' acute chest illness, which had responded dramatically but temporarily to penicillin in another hospital. Extremely ill, toxic and drowsy, on admission. Definite signs of consolidation were evident over the right lower lobe and early signs of left lower lobar involvement were also noted. The urine contained blood, albumin and leucocytes in excess. A pure culture of pneumo-bacillus was obtained from both urine and sputum. The sputum was of the appearance and consistency of red-currant jelly, and he produced about 3 oz. of this daily. The patient recovered during and following ten daily injections of 1 gm. of streptomycin. The total duration of the illness was eight weeks.

One year later he was in good health, though complaining of persistent cough and sputum.

CASE 2.—Male, æt. 59. Two weeks' history of pain in the right chest, cough and sweating. Sulphonamide treatment had been ineffective, and on admission he was very ill and breathless. Signs of pneumonia of the right upper lobe were noted, and the formation of abscess suspected. He produced 6 oz. of rusty sputum daily. He failed to improve on penicillin (1 mega daily for four days) but responded dramatically to daily injections of streptomycin (1 gm.) for seven days. He seemed apparently well for three days, with normal temperature, and then suddenly fell back dead. Autopsy revealed confluent broncho-pneumonia of the right upper lobe with an abscess cavity in the centre.

CASE 3.—Male, æt. 47. Dramatic onset, with agonising pain in his right chest behind, causing him to faint. Acutely ill on admission one hour later, and in great pain with breathlessness. Pneumonic signs noted over right lower lobe. Improved with penicillin treatment, but despite this the disease spread to the left lower lobe, and a severe recurrence of symptoms followed. Final cure was uneventful, after seven daily injections of streptomycin. Subsequent X-ray examination showed a normal picture.

Seen one year later, he was well and free of symptoms.

CASE 4.—Male, æt. 64. Four days before admission he suddenly became ill with pain in left chest, shivering, and extreme breathlessness. On admission he was thin and ill, and was coughing up 3 or 4 oz. of brownish sputum daily. Pneumonic signs over left lower lobe. Penicillin was given in full dosage, but streptomycin was substituted as soon as the sputum culture was available, and ten days' treatment then sufficed for cure. X-ray examination, in the later stage of the illness, showed an opacity of the left lower lobe, with a raised diaphragm.

He suffered from a persistent cough with sputum, and from breathlessness, but returned to work until killed in an accident six months later.

BACTERIOLOGY OF THE SPUTUM IN EIGHT CASES OF FRIEDLANDER PNEUMONIA

Case	First Specimen	Second Specimen	Later Specimens	Treatment in Hospital
1	<i>Pneumo-bacillus</i> (R). Scanty <i>Strep. viridans</i> . Urine yielded a pure culture of <i>pneumo-bacillus</i>	"Normal flora"		Streptomycin 1 gm. daily, 2nd to 12th hospital day.
2	Hemolytic streptococcus (S). <i>Pneumo-bacillus</i> (R)	<i>Pneumo-bacillus</i> (R). Few colonies of <i>Staph. aureus</i>	Scanty <i>Staph. aureus</i> only	Penicillin 1 mega daily for 4 days. Streptomycin 1 gm. daily for 7 days.
3	<i>Pneumo-bacillus</i> (R) in pure culture	<i>Staph. albus</i>		Penicillin 1 mega daily for 5 days. Streptomycin 1 gm. daily for 7 days.
4	<i>Pneumo-bacillus</i> (R). Few colonies of <i>Strep. viridans</i> and staphylococcus	<i>Strep. viridans</i>		Penicillin 1 mega daily for 4 days. Streptomycin 1 gm. daily for 7 days.
5	<i>H. Influenzæ</i> (R). <i>Pneumo-bacillus</i> (R)	<i>Pneumo-bacillus</i> (R) (pure culture)	Sterile	Penicillin 2 mega daily for 3 days. Streptomycin 1 gm. daily for 6 days.
6	<i>Pneumo-bacillus</i> (RS) <i>Staph. albus</i>	<i>Staph. albus</i>		Penicillin 2 mega daily for 14 days, and sulphamezathine 60 tablets.
7	<i>Pneumo-bacillus</i> (R) in pure culture	Gram-negative bacilli in direct smear. No growth		Penicillin 1 mega daily for 3 days. Streptomycin 1 gm. daily for 5 days.
8	<i>Pneumo-bacillus</i> (R) in pure culture	Not obtained		Penicillin 1 mega daily for 3 days. Streptomycin 1 gm. daily for 14 days.

Note: All patients, with the exception of Case 1, had been given sulphonamide treatment before admission. Only one patient (Case 1) had been given full penicillin treatment before admission.

R=resistant to penicillin.

S=sensitive to penicillin.

RS=partially sensitive to penicillin.

CASE 5.—Male, æt. 17. He was crushed between a lorry and a wall two days before admission. He suffered great pain and extreme breathlessness, and on admission was very gravely ill, with violet cyanosis, and was in great distress. There were signs indicative of pneumonia of the left lower lobe, and he had a localised hæmo-pneumo-thorax. Extensive subcutaneous emphysema

was present. The condition of the left upper lobe was uncertain, but it was thought to be the seat of a pulmonary hæmatoma. Generalised bronchiolitis of the right lung was also diagnosed. Pencillin (2 mega daily) failed to improve him, but streptomycin (1 gm. daily for six days) brought about a cure. X-ray examination after the illness gave a normal result.

Seen one year later, he was well and free of symptoms.

CASE 6.—Female, æt. 74. Three days' history of an acute illness, characterised by cough and shivering. This occurred while she was recovering from an attack of thrombo-phlebitis. Very ill, obese and extremely breathless, coughing up 2 oz. of purulent sputum daily. Signs of consolidation of the right lower lobe were noted. Cure followed intensive penicillin with an ordinary course of sulphamezathine (*i.e.*, 80 tablets). X-ray examination, during the fourth hospital week, showed raised right diaphragm only. One year after discharge the patient died of an unknown cause, apparently unconnected with the pneumonia or its effects.

CASE 7.—Female, æt. 42. Three weeks before admission she developed a "chesty cold," with a cough. One week later her acute illness began with a sharp pain between the shoulder blades. On admission she was acutely, but not seriously, ill. Signs of left lower lobar consolidation were observed. There was no response to penicillin (1 mega daily), but cure rapidly followed when 1 gm. of streptomycin was given daily for five days. Two years later the patient was well and free of symptoms.

CASE 8.—Female, æt. 68. One year before admission she had pneumonia, since when she had suffered from cough, sputum and breathlessness, with poor general health. X-rays showed a persisting opacity in the right lung field. One week before admission she was seized with a severe sharp pain in her right chest, and began to shiver, to sweat and to cough. On admission she was extremely ill and well-marked physical signs were noted over both lower lobes. A lung abscess was suspected, in spite of the non-purulent sputum. There was no response to penicillin, but definite improvements followed streptomycin treatment (1 gm. daily for fourteen days). After this she remained fairly well for three days. She then, quite suddenly, fell back dead.

No post-mortem examination was permitted.

Comment

Cecil divides the disease into acute and chronic varieties, the latter leading to multiple abscess formation, chronic sepsis and recurrent pneumonic illnesses. The acute illness is usually a widespread confluent broncho-pneumonia, but in a minority of cases it is of lobar type, and this seems to be a more rapidly progressive or even fulminating condition (Ritvo and Martin, 1949).

A study of the case records of the present series suggests that five of the survivors belonged to the acute broncho-pneumonic group, that Cases 1 and 2 were of the acute lobar variety, and that Case 8 represented the chronic type.

The age incidence accords closely with that reported by all authors. Only 1 of the 8 was below the age of 40. This observation is perhaps not very striking now that the average age of patients with pneumonia admitted to hospital is so much higher than formerly, but Friedländer pneumonia has always been a disease of the later decades.

Only 1 of the 6 survivors had been ill for more than four days at the time

of admission, and he had responded well to penicillin during the first week of his illness. The relapse caused by Friedländer infection was only three days old at the time of his admission.

The 2 fatal cases were, however, at the end of the first and second week of the disease respectively when admitted.

A study of the literature shows that most of the reported cases were admitted in the first week of the disease and almost all within two weeks. The fatal cases were usually dead within ten days of the onset. The importance of early treatment is thus emphasised.

The story in the 8 cases was always of an acute onset with pain and breathlessness, and of steady deterioration in spite of sulphonamide treatment given by the home doctor. A comparison of the history with the physical signs noted on admission suggested that in these patients the disease was a steadily extending pneumonia. Although seriously or acutely ill on admission, 3 of the 8 were less gravely ill than the accounts given in the literature would suggest. One wonders whether the sulphonamide treatment given by the family doctor influenced the course of the disease in any way. Perlman and Bullowa (1941) were confident that in their case treated with sulphapyridine the patient's recovery could be attributed to the drug. He was extremely ill when admitted on the second day of the disease and deteriorated during the first two hospital days. Sulphapyridine treatment was instituted on admission (5 gm. followed by 1 gm. at four-hourly intervals), and on the third day of treatment he began to improve. Sulphapyridine was continued for six days in all, and the course of the illness thereafter was one of steady, if slow, improvement, going on to complete cure.

As this patient yielded a positive blood culture, the classification of him by the authors as an "acute fulminating" case seems justified. Furthermore, of the 6 survivors in their series of 37 cases, 4 were treated with sulphapyridine. Of the other 2, one was a chronic and the other an ordinary "acute" case. Only 3 other patients who were given sulphapyridine survived long enough (*i.e.*, forty-eight hours or more) to allow of a fair trial of the treatment, and of these one showed temporary improvement. The sensitivity of the pneumobacillus to sulphonamide was unfortunately not tested in the present series of cases, but the American experience just described suggests the possibility that sulphonamides, while only rarely bringing about a cure, may slow down, or even check temporarily, the course of the disease.

Apart from the relative "mildness" of the 3 cases just mentioned, the cases resemble the generally described picture of Friedländer pneumonia.

Cecil emphasises early prostration as a usual feature, and this applied to 5 of the 8 cases. Delirium was not a prominent feature, although in 4 cases a certain mental obscurity was observed from time to time. Cyanosis and breathlessness were obvious in 5 cases, but in the other 3 pain was a much more prominent feature. In fact, in all 8 patients, pain was an outstanding and even troublesome symptom. In the majority it was very severe in the early days of the illness. Hæmoptysis was absent in 4 of the 8, including both the fatal cases; and in only one was the "typical" red-currant jelly sputum seen.

The leucocytes varied widely. Counts were low or moderate in 4 patients (*i.e.*, 10,000 per c.mm. or less), but in the other 4 counts were high, ranging

up to 21,000. One of the patients was, however, proved to have a lung abscess at post-mortem examination, and another had profuse brownish and slightly offensive sputum. Both these men, therefore, showed evidence of a suppurative complication.

Blood culture was not attempted in these cases, but is said to be positive in about 50 per cent. as a rule.

X-ray examination of the chest was not carried out in the acute phase of the illness in any case, as it did not appear that it was likely to benefit the patients, but skiagrams made later showed the usual picture of pneumonia in the six survivors. In only one case were the appearances described by Felson *et al.* as characteristic observed. Perhaps a film taken at an earlier stage might have yielded a different result in the others. They described convexity of the fissure lines, suggesting a bulging or "swelling" of the affected lobe, stating that in their opinion this was of diagnostic importance.

The predilection of the disease for the upper lobes stressed by Cecil was not seen in this series, although the tendency towards multilobar infection was noted. In only 2 was an upper lobe involved, but in 5 of the 8 cases the disease was multilobar.

"*Response to Treatment.*"—The final diagnosis in this series has been based in part on the response to streptomycin treatment. This should perhaps be briefly defined. By "response" to treatment is implied, in the first place, a definite and recognisable improvement in the patients' general condition as recognised by the nursing and medical staff and by the patient himself. This shows itself in an increased awareness and interest in his surroundings, in a desire for nourishment and an increase in activity in bed. These changes, though relatively slight at first, are easily recognisable and precede any clear effect on the temperature. An obvious decline in fever, though essential, may not be recognised for forty-eight hours, but clinical improvement is, as a rule, obvious within twenty-four hours if it is going to take place at all.

Summary

1. Eight cases of Friedländer pneumonia are described, 6 of which recovered.
2. These 8 cases were all seen within a period of thirteen months (December 31, 1948, to January 31, 1950).
3. Five of the 6 survivors were cured by streptomycin after penicillin treatment had failed.
4. One patient, in whom the pneumo-bacillus was partially sensitive to penicillin, was cured by penicillin alone.
5. The 2 patients who died both did so suddenly and unexpectedly, after several days of well-being and normal temperature had succeeded an apparent response to streptomycin.
6. In 1 of the fatal cases a lung abscess was found at autopsy, in the right upper lobe; and in the other, an abscess in the right lower lobe was suspected clinically. No other lung abscess was diagnosed, clinically or radiologically.
7. Of the 8 cases, the disease was confined to the lower lobes in 6, although multilobar infection occurred in 5.
8. The leucocyte count was high in 4 cases, but in 2 of these evidence of suppuration was present.

9. It is suggested that the sulphonamide treatment given by the home doctor may have slowed, or temporarily checked, the progress of the disease, thus accounting for the fact that 3 of the 8 patients were less seriously ill than those described in the literature.

REFERENCES

- CECIL, R. L. (1947): Textbook of Medicine, 7th edition. W. B. Saunders and Co., Philadelphia and London. Pp. 338-340.
- PERLMAN, E., and BULLOWA, J. G. M. (1941): *Arch. intern. Med.*, **67**, 907.
- BHATNAGAR, S. S., and SINGH, K. (1935): *Indian J. Med. Res.*, **23**, 337.
- FELSON, B., ROSENBERG, S. L., and HAMBURGER, M. (1949): *Radiology*, **53**, 559.
- NATARO, M., SHAPIRO, D., and GORDON, A. T. (1950): *J. Amer. Med. Ass.*, **144**, 12.
- RITVO, M., and MARTIN, F. (1949): *Amer. J. Roentgenol.*, **62**, 211.
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Lungs Inflamed: Take Red Poppy-flowers a quarter of a peck, infuse them in Spring-water very hot, but not boiling hot, and let them stand twenty four hours, then wring them out; infuse the like quantity of fresh Flowers, and having well press'd them after a convenient standing, boil up the Liquor in a Bath, till with its equal weight of Sugar it is made into a syrup.

Half an ounce at a time is a sufficient Dose, and being exceeding Cooling, it not only helps the Inflammation of the Lungs, but also Pleurisies; and is good in most Heats, or hot Diseases, easing Pains in the Head, and causing rest.

WILLIAM SALMON: *The Family-Dictionary; or, Household Companion*, 2nd ed., London, 1696, p. 192.

THE RESULTS OF SANATORIUM TREATMENT OF CASES OF PULMONARY TUBERCULOSIS DISCOVERED BY MASS RADIOGRAPHY

By H. S. FRASER

From the Mount Sanatorium, Hants

VARIOUS opinions on the value and functions of mass radiography have been expressed in the British medical press. There is general agreement that it is financially impracticable to carry out mass X-ray surveys of the entire population at regular and frequent intervals, and the wider question of the desirability of such national surveys does not arise at present. It is further agreed that some method of selection must be employed, and various sections of the community have been suggested as being the most productive of positive results. The problem is not solved, however, even when this selection is made. The whole population could be subdivided into a graduated series of groups arranged according to expected yield of significant findings, but opinions would differ as to how many of those groups should be regularly surveyed. Some authorities would limit the use of mass radiography (M.R.) to the relatively small number of cases submitted by general practitioners because of suspicious clinical manifestations. Others would extend the use of M.R. to large sections of industry and to school leavers; while others would concentrate on persuading the general public to visit the M.R.U. in unlimited numbers.

It is clear that these differences indicate a wide divergence of opinion about the fundamental value of M.R. in the practice of medicine. What can M.R. contribute to preventive and curative medicine? What is the fate of those cases discovered by M.R.? What would the future of those cases be if they were not discovered by M.R.? And, especially from a tuberculosis point of view, what would be the effect on the community as a whole if they had not been picked up by M.R.? With such questions in mind the following small survey was carried out.

MATERIAL

This survey deals with the first hundred admissions to the Mount Sanatorium of cases of pulmonary tuberculosis discovered by M.R. The admissions occurred over a number of years as follows: 1943, 2; 1944, 18; 1945, 19; 1946, 11; 1947, 23; 1948, 18; 1949, 9. To obtain a series of controls the first succeeding admission was taken unless that case proved to have had previous institutional treatment for pulmonary tuberculosis, in which case the next succeeding admission was taken. Such "old cases" might have been re-admitted for nursing during their terminal illness, and their inclusion would weight the control group unfavourably. The intention to avoid all readmissions was not quite realised. A later scrutiny of the case papers revealed that seven out of the hundred controls had had some institutional treatment for pulmonary tuberculosis at periods varying from four to fourteen years previous to the

present admission. These seven cases might be considered to differ significantly from the remainder of the control group, but, as only one of these seven patients died in sanatorium, any difference would appear to be favourable to the control group results.

AGE

The average age on admission of the M.R. group cases was 33 years, and of the controls, 37 years. The distribution in age groups is given in Table I.

TABLE I

			10-20	20-30	30-40	40-50	50 and over
M.R.	..	..	11	28	31	21	9
C.	..	..	5	24	26	26	19

The cases were classified in accordance with the revised Section I of the appendix to the Ministry of Health Memorandum 37/T (1947).

CLASSIFICATION

The classification on admission is given in Table II.

TABLE II

			Total		Total		Total		Total	
			A.1	A.2	A.3	A	B.1	B.2	B.3	B
M.R.	..	..	14	4	—	18	26	49	7	82
C.	..	..	10	3	—	13	10	46	31	87

Many of the cases were admitted before the advent of memo. 37/T, and the selection of cases for sub-groups (2) and (3) had to be judged from the documents. It should be noted here that there was complete uniformity of clinical judgment in the documents scrutinised, as every case in both M.R. and C. groups was dealt with by the same clinician. The majority of cases in control sub-group B.3 were so placed because of laryngeal involvement.

SYMPTOMS PRIOR TO DIAGNOSIS

Twenty-five M.R. and 27 C. cases had, for periods varying from three months to three years in both groups, symptoms which should have led to diagnosis. This particular factor was not specially borne in mind in the taking of histories, and the figures extracted from the case notes are probably low.

PREVIOUS M.R. FILM IN M.R. GROUP

Twenty M.R. cases had had a previous M.R. film, after which no action was taken—*i.e.*, with presumably negative or negligible findings. The period between the miniature films ranged from three months to five years and averaged two and one-third years.

ACTIVE TREATMENT

Fifty-seven M.R. cases and 30 C. cases received some form of active treatment. No artificial pneumothorax or pneumoperitoneum, which was abandoned as ineffective before the patient's discharge is included in these figures. The details of the measures taken are given in Table III.

TABLE III

<i>Treatment</i>	<i>M.R.</i>	<i>C.</i>
Artificial pneumothorax ..	42	22
Phrenic crush ..	20	12
Artificial pneumoperitoneum ..	4	4
Thoracoplasty ..	3	0
Extrapleural pneumothorax ..	1	0

Streptomycin and P.A.S. were administered to only one case in each group. It should be noted that each M.R. case and the corresponding control were admitted usually in the same week, and in all cases within two weeks of each other, and that therefore the range of available treatment was identical.

CLASSIFICATION ON DISCHARGE

Shown in Table IV.

TABLE IV

	<i>Quiescent</i>	<i>Active</i>	<i>Died</i>
M.R.	67	27	6
C.	34	42	24

The Memorandum 37/T criteria for quiescence were not applied to those cases which had been discharged before the new classification was adopted. The opinion stated on the discharge report sheet was accepted.

DURATION OF SANATORIUM TREATMENT

The average duration of sanatorium treatment was 9.3 months for the 94 surviving M.R. cases and 8.3 months for the 76 surviving control cases.

FAMILY HISTORY

There was a family history of tuberculosis in 33 M.R. cases and 28 controls.

FOLLOW-UP

The condition of the patients on 31.12.49 is shown in Table V.

TABLE V

	<i>Arrested</i>	<i>Quiescent</i>	<i>Active</i>	<i>Died</i>	<i>No details available</i>	<i>Total</i>
M.R.	26	34	29	8	3	100
C.	5	24	28	40	3	100

Discussion and Conclusion

The M.R. cases had an initial advantage in that they came under treatment at an earlier age than did the controls. The average difference in age was four years, but the difference is more significant when seen in age groups (Table I). The high proportion of "B" cases in the M.R. group (82 per cent.) indicates that the chest clinic physicians concerned sought admission only for cases whose lesions were considered to be active. The percentages of B.2 (49) and

of B.3 (7) among the M.R. cases are surprisingly high. The high proportions of B.1 (26 per cent.) in the M.R. group and of B.3 (31 per cent.) in the control group have obviously a very important bearing on the results of treatment.

That 25 per cent. of M.R. cases and 27 per cent. of control cases had symptoms which should have led to diagnosis for periods up to three years is an important finding, but not relevant to the present discussion. Similar remarks apply to both the figures of 20 per cent. for M.R. cases who had a previous M.R. examination at an average of two and a half years before the film which led to diagnosis, and the figures for the presence of a family history of tuberculosis.

The number of M.R. cases who received active treatment was almost double that of the controls—57 per cent. against 30 per cent. On an average the surviving M.R. case remained one month longer in sanatorium than the control case. This is in marked contrast to Clutterbuck's figures quoted by Kerley (1950), in which the average M.R. case stay was six to seven months and that of the control group case eighteen months. In the present survey the preponderance of active treatment in the M.R. group was probably the main factor causing the longer stay in sanatorium. The waiting time for pneumolysis, for instance, increased considerably the stay in sanatorium. Table IV shows that the results of sanatorium treatment were much more favourable for the M.R. group than for the control group. The follow-up results in Table V heavily underline the more favourable prognosis for the M.R. group of cases.

The significance of these results depends on the comparability of the two groups. If the groups could be accepted as being strictly comparable, then it would be reasonable to conclude that, but for M.R., the M.R. group cases would have been destined to a fate identical with that of the control group, and in this case even this small survey could be taken as proof that M.R.'s contribution to curative medicine alone was of the highest magnitude. But the groups cannot be accepted as strictly comparable, and the degree of comparability is difficult or impossible to define. There is the obvious difference that the M.R. cases *did* report to the M.R.U. Numerous variable factors led the M.R. case to the M.R.U.—factors such as mental and physical state of health, occupation, situation of dwelling, family responsibilities, etc. On the other hand, the controls did not attend the M.R.U. It is not known how many controls had the opportunity to do so, nor is it known how many would have availed themselves of such an opportunity. It is not known how many M.R. cases suspected the presence of pulmonary tuberculosis and in the absence of M.R. would have pressed for a diagnosis through their general practitioner. The presence of these and other unknown factors tends to diminish the comparability of the two groups. And yet, when we consider that 82 per cent. of M.R. cases had tubercle bacilli in the sputum, it is very difficult to avoid the conclusion that without the M.R.U. the lesions would have progressed slowly or rapidly until the patients ultimately came to diagnosis in a state very similar to that of the control group cases.

Summary

The results of sanatorium treatment of 100 consecutive cases of pulmonary tuberculosis discovered by M.R. and of 100 cases of a comparable control group are compared. The M.R. cases were younger on admission, their lesions less extensive and more amenable to active treatment, and their prognosis much more favourable.

My thanks are due to Dr. A. Capes, Medical Superintendent, Mount Sanatorium, for permission to publish these results.

REFERENCE

KERLEY, P. (1950): *Lancet*, 2, 750.

The sooner the Cure of a Consumption is begun, the better it usually succeeds; and from hence this Distemper especially proves fatal, because the Physician is consulted when 'tis too late. . . .

RICHARD MORTON: *Phthisiologia: or, a Treatise of Consumptions*, London, 1720.

UPPER LOBE BRONCHIECTASIS

By A. W. LEES

From Ruchill Hospital, Glasgow

BRONCHIECTASIS affecting the upper lobes infrequently gives rise to trouble, but when it does it is apt to cause confusion. The following cases illustrate some of the diagnostic difficulties and etiological problems.

UPPER LOBE BRONCHIECTASIS SIMULATING CYSTIC DISEASE

Case 1.—On 14/12/46 a girl aged 7 years was admitted to Ruchill Hospital with pyrexia and pain in the left side. Physical signs suggested a left pleural effusion, and this was confirmed by an X-ray film which showed an opacity extending over the left lung field, but especially dense in the upper two-thirds. The mediastinum was displaced to the right. Aspiration on 19/12/46 produced 12 fl. oz. of straw-coloured fluid which yielded no growth on culture. An intermittent pyrexia with evening peaks of 102°-103° F. settled fourteen days after admission, and the patient felt well and remained well. A Mantoux test was positive. A month later physical examination revealed dullness and diminished R.M. over the upper two-thirds of the left lung, and an X-ray showed a dense opacity in this area with clearing of the lower third of the lung field. There was pleural thickening or a trace of fluid in the left costo-phrenic angle, and the mediastinum was central. A chest film on 9/9/47 (Fig. 1) showed substantially the same picture, save that the pleural thickening had disappeared. During the next two years there was a gradual irregular clearing of the opacity in the upper left lung field from the periphery inwards, so that the lateral part looked cystic. Bronchography was carried out on 14/9/48, but the lipiodol penetrated only a short distance into the branches of the left upper lobe bronchus. In 1949 the patient was given a routine examination by a physician unacquainted with her previous history. Loud bronchial breathing, unaccompanied by adventitious sounds, was heard over the left upper lobe, and as a straight X-ray and tomogram (Fig. 2) showed honeycombing in this area, the condition was diagnosed as cystic disease of lung. A bronchogram on 18/10/50 (Fig. 3) showed gross bronchiectasis of the left upper lobe and lingula. The bronchi in the left upper lobe proper were much distorted, and the lipiodol did not enter the subapical segment.

It will be seen that the original trouble was a left pleural effusion and the condition first described by Eliasberg and Neuland (1920-21) as "epituberculosis." Friedenberg (1926) and others considered "epituberculosis" was an allergic response to a small focus of tubercle bacilli, but this view has received little support. Cameron and de Navasquez (1936) and MacGregor and Alexander (1937) produced evidence indicating that the condition may be a benign, non-caseating tuberculous pneumonia, and Spence (1932) and Parsons (1934) isolated tubercle bacilli from lung puncture material. Wallgren (1926) suggested that some cases of "epituberculosis" were really cases of absorption collapse resulting from bronchial compression by enlarged tuberculous glands, and bronchoscopic investigation has since so frequently revealed bronchial occlusion that many authorities now consider all cases are of this nature.

Morlock and Pinchin (1933) were the first in this country to present bronchoscopic evidence of bronchial occlusion by enlarged glands, and recently Hutchison (1949), who carried out bronchoscopy in forty cases, found evidence of bronchial obstruction in all but two, and in these there was segmental involvement beyond the reach of the bronchoscope. Nevertheless, it is difficult to believe that all cases of "epituberculosis" are merely examples of absorption collapse. In the present instance, for example, although the whole of the left upper lobe and the lingula were involved, postero-anterior and lateral X-ray films showed only slight evidence of lung shrinkage, and in four other cases of "epituberculosis" the X-ray pictures were of complete upper lobe consolidation, not collapse; there was no mediastinal shift, upward swing of the minor fissure, or upward displacement of lower lobe bronchi as seen in bronchograms to indicate that the affected lobes had diminished in volume. Hutchison (1949) stated that he found the classical signs of atelectasis in only thirty-five of ninety-one cases, and although in some there was doubtless only segmental involvement, illustrations (Figs. 4 and 5) of one of his cases show substantially consolidation and not collapse of the left upper lobe, despite bronchoscopic and bronchographic evidence of complete obstruction of the left upper lobe bronchus distal to the origin of the lingular branch.

In such cases it is difficult to resist the conclusion that before obstruction of the bronchus of supply is complete the alveoli of the affected portion of lung have been filled with exudate—otherwise the air would have been absorbed and the typical picture of absorption collapse produced. As constriction of the bronchial lumen by enlarged glands has been so constantly observed, it seems possible that in cases showing the picture of consolidation an enlarged gland has eroded the bronchus without at first completely obstructing it, and material entering the lumen has given rise to a benign tuberculous pneumonia of the type reported in man by Cameron and de Navasquez (1936) and MacGregor and Alexander (1937), and produced experimentally in sensitised rabbits by Oppenheimer (1935) as the result of intra-bronchial injection of tubercle bacilli. Also, glandular erosion of a bronchus might produce complete obstruction of a segmental bronchus with collapse of that segment, and at the same time material in the lumen might find its way to other segments producing consolidation. It is noteworthy that in eight cases of "epituberculosis" in which recovery was complete, Hutchison (1949) isolated tubercle bacilli from material in obstructed bronchi. Frequently, of course, extrinsic pressure from enlarged tuberculous glands produces bronchial obstruction with uncomplicated absorption collapse, and judging from the X-ray illustrations, the case presented by Morlock and Pinchin (1933) was of this type.

Following the work of Tannenbergh and Pinner (1942), retention of secretion distal to the bronchial obstruction is the mechanism usually suggested for the production of bronchiectasis in primary tuberculosis (Jones *et al.*, 1950, and others), and this seems feasible when the bronchiectasis is mild and cylindrical in type. It is not easy to visualise such a process, however, when the bronchiectasis is gross and saccular in character, as in part of the lung in Case 1. Destruction of the bronchus with subsequent re-epithelialisation, as suggested by Rilance and Gerstl (1943) in cases of re-infection tuberculosis, seems a possibility in "epituberculosis" also.

UPPER LOBE BRONCHIECTASIS CAUSING HÆMOPTYSIS

Upper lobe bronchiectasis giving rise to hæmoptysis is liable to be mistaken for active pulmonary tuberculosis, and in older age groups occasionally for bronchial carcinoma.

Case 2.—A female, aged 34 years, was seen on 13/3/50. She stated that she had had a productive cough for a week, and that the sputum had been slightly blood-stained for three days. In December 1949 there had been a similar episode, and though physical examination at a tuberculosis dispensary had revealed no abnormality, an X-ray had shown fibrosis in the left upper lobe. Pulmonary tuberculosis was suspected, but the patient did not return for further observation as requested. *M. tuberculosis* was not isolated from the sputum. On the present occasion physical examination revealed only a few fine crepitations over the subapical segment of the left upper lobe. There was no clubbing of the fingers, and sputum examination did not reveal the tubercle bacillus. A straight X-ray showed fibrosis in the left upper lobe, and the radiologist reported on a tomogram as follows: "There is an appearance on the 3-inch tomogram suggesting large cyst formation in the left apex. The presence of a cyst is not confirmed on the other films, and the appearance is apparently due to fibrosis." Subsequent bronchography (Fig. 4) revealed cystic bronchiectasis of the apical and subapical segments of the left upper lobe. The patient's symptoms disappeared a few days after her initial examination, and there was no recurrence up to 5/2/51, when she was last seen.

Repeated attempts to isolate the tubercle bacillus from the sputum during the episodes of the productive cough failed, and there is little doubt that her symptoms were due to acute inflammation of the dilated bronchi in the left upper lobe and not to active pulmonary tuberculosis.

When there is a known previous history of tuberculosis, upper lobe bronchiectasis is all the more likely to cause confusion. The following case is an example.

Case 3.—A female, aged 28 years, presented in December 1948 with precisely the same symptoms as Case 1. A few crepitations could be heard over the pectoral segment of the right upper lobe. Two years previously she had had a brief episode of productive cough and hæmoptysis. An X-ray at a tuberculous dispensary then revealed fibrosis in the right upper lobe, and she was regarded as suffering from active pulmonary tuberculosis. She had attended the same dispensary in childhood because of tuberculous cervical adenitis, and X-ray films of her chest had shown enlargement of the right hilar glands. Two enlarged glands had been removed from the neck, and pathological examination had confirmed that they were tuberculous. Bronchography in 1948 showed cystic bronchiectasis of the pectoral segment of the right upper lobe and also cylindrical bronchiectasis of the right middle lobe. Tubercle bacilli were never isolated from her sputum, and when seen in February 1951 she was well.

It seems probable that the etiology of the bronchiectasis in the previous two cases was similar to that in Case 1. In an effort to estimate the incidence of bronchiectasis following primary tuberculosis Jones *et al.* (1950) carried out bronchography in a group of children at a mean interval of three and a half years following clearing of tuberculous lesions seen on X-ray films. Thirty-four satisfactory bronchograms were obtained in cases in which X-ray films

had previously shown consolidation and in the majority of which bronchoscopy had demonstrated various degrees of bronchial obstruction associated with the consolidation. Tubercle bacilli were isolated from the lungs of thirty-three of the thirty-four children. Bronchiectasis was demonstrated in twenty-four of the thirty-four cases, was equally common in the right and left lungs, usually affected only one bronchial branch, and chiefly involved the antero-lateral (pectoral) segments of the upper lobes. Patients in whom bronchial obstruction had been demonstrated did not invariably develop bronchiectasis, while on the other hand some patients in whom the bronchial tree had appeared normal did develop bronchiectasis.

The writer carried out bronchography on twelve patients, including Case 1, who three or four years previously had suffered from primary tuberculosis of a type similar to that described in the cases of Jones *et al.* (1950). Two showed evidence of marked bronchiectasis (Case 1 and another child with saccular bronchiectasis of the pectoral segment of the right upper lobe), four others showed mild cylindrical dilatation of single branches, and six were normal. As with the cases of Jones *et al.* (1950), there was no convincing evidence that the duration of the lesions seen on X-ray determined the production of bronchiectasis. It may be noted that these authors drew attention to the fact that the lingular process escaped in all their cases, but in Case 1 it was grossly involved.

Only one of the cases examined by Jones *et al.* (1950) had symptoms requiring attention, and all of the twelve cases examined in the present study were symptomless, though it is possible that trouble may arise later. Most cases of bronchiectasis following primary tuberculosis are probably silent, because the upper lobe is usually involved and drainage is good in this situation. There is a high incidence of pulmonary tuberculosis in Glasgow, and post-primary bronchiectasis is therefore probably common, yet of the last 100 cases of bronchiectasis with symptoms examined by the author only three had disease confined to an upper lobe and of these two were diagnostic rather than therapeutic problems. The third case was of a boy of ten years who presented with the classical history, signs and symptoms of infected bronchiectasis; a bronchogram showed that the disease was confined to the pectoral segment of the right upper lobe and was saccular in type. Six years previously he had been admitted to a sanatorium because of gross tuberculous enlargement of the hilar glands.

Of course, quite frequently bronchiectasis of an upper lobe is found in association with bronchiectasis of other lobes, and bronchiectasis of the pectoral segment of the right upper lobe with bronchiectasis of the right middle lobe is a not infrequent and suggestive combination. It is well known also that some cases of infected bronchiectasis of the middle and lower lobes have an original tuberculous etiology, but it is difficult to estimate in what proportion they occur.

UPPER LOBE BRONCHIECTASIS SIMULATING CAVITATION

Case 4.—A man aged 30 years was seen on 28/9/50 because, having previously suffered from pulmonary tuberculosis, he wished to have his chest examined. He felt well, and had no complaints except for an occasional productive cough when the weather was bad. The records of a tuberculosis

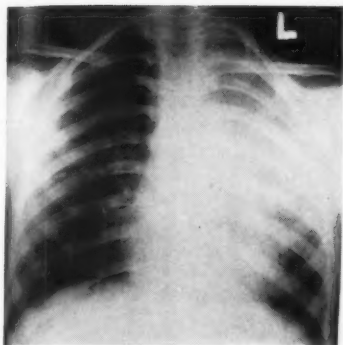


FIG. 1.—P.A. X-RAY 9/9/47. "EPI-TUBERCULOSIS." CASE 1. LEFT UPPER LOBE.



FIG. 3.—P.A. BRONCHOGRAM 18/10/50. CASE 1. BRONCHIECTASIS LEFT UPPER LOBE AND LINGULA.



FIG. 5.—CASE 4. P.A. X-RAY.



FIG. 2.—TOMOGRAM 29/6/49. CYSTIC APPEARANCE. CASE 1. LEFT UPPER LOBE.

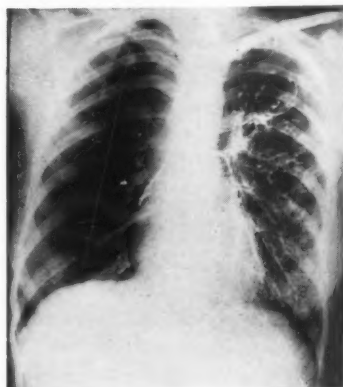
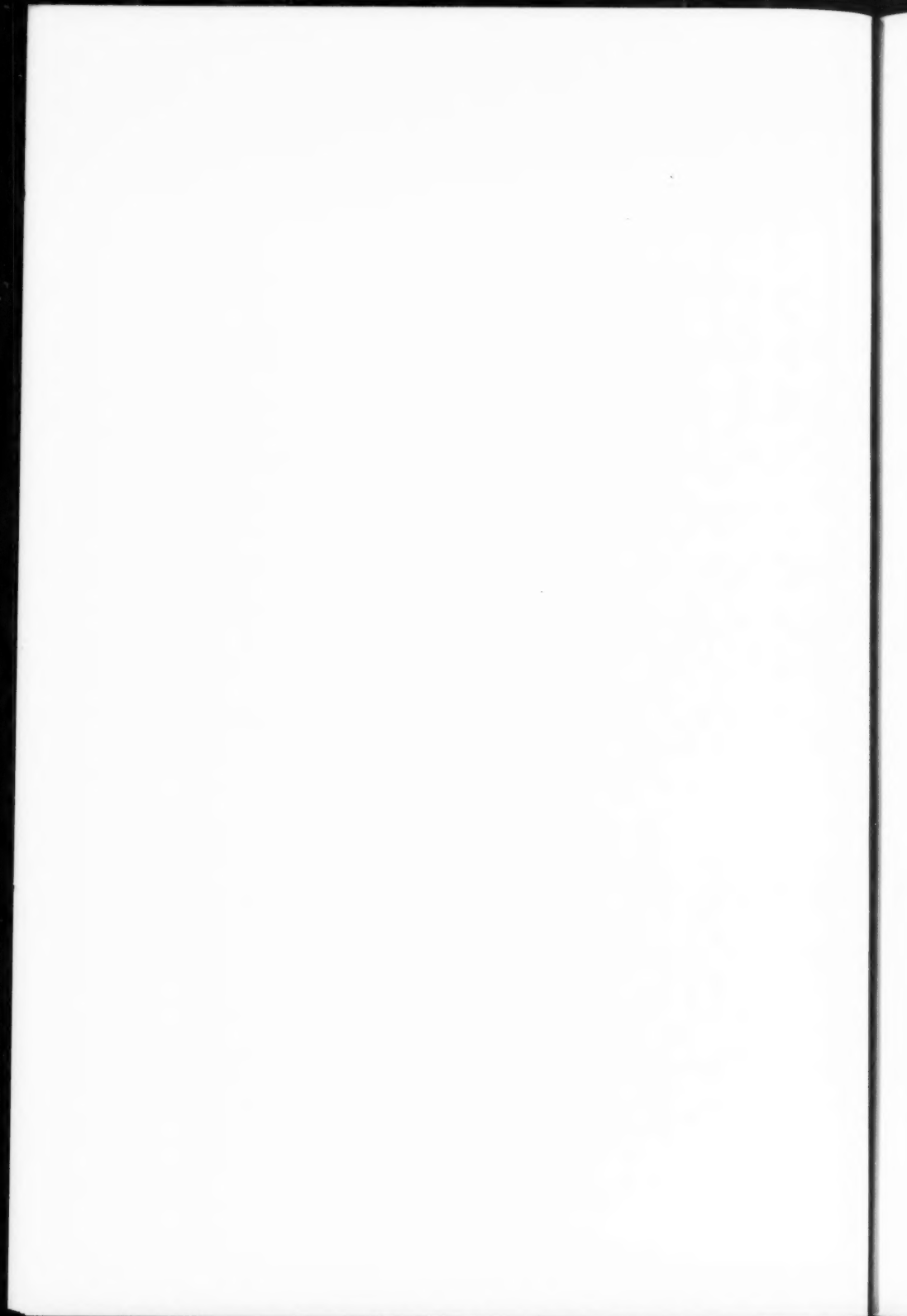


FIG. 4.—P.A. BRONCHOGRAM. CYSTIC. CASE 2. DILATIONS IN LEFT UPPER LOBE PARTLY OUTLINED BY OPAQUE MEDIUM.



FIG. 6.—CASE 4. BRONCHOGRAM SHOWING BRONCHIECTASIS IN PARTIALLY COLLAPSED RIGHT UPPER LOBE.



dispensary revealed that in May 1939 tubercle bacilli had been isolated from his sputum, and X-ray films had shown active pulmonary tuberculosis in the upper two-thirds of both lungs. Four months' rest in a sanatorium produced marked improvement in his condition, and after discharge progress was maintained. In October 1941 X-ray films of his chest suggested that the disease was inactive, and he felt so well that he did not attend the dispensary again.

Physical examination on 28/9/50 revealed an impaired percussion note and bronchial breathing, accompanied by a few crepitations over the right upper lobe. An X-ray was reported as showing much evidence of healing with calcification in both lungs, and partial collapse of the right upper lobe with probable cavitation in this area (Fig. 5). Repeated examinations of sputum were made and on two occasions tubercle bacilli were isolated. The excellent condition of the patient suggested a diagnosis of chronic low-grade tuberculosis, with bronchiectasis rather than cavitation in the right upper lobe. A bronchogram (Fig. 6) showed gross bronchial dilatation in the right upper lobe and also cylindrical bronchiectasis in the lateral segment of the right middle lobe.

As would be expected in a case of reinfection tuberculosis, there was never evidence of enlarged hilar glands. The collapse and bronchiectasis may have been produced by occlusion of the larger bronchi from other causes, but Erwin (1939) showed that in reinfection tuberculosis absorption collapse and compensatory bronchiectasis, usually affecting an upper lobe, was commonly due to aspiration of secretion into the bronchioles, and this was probably the mechanism in the present case.

From the point of view of prognosis and treatment, it is obviously important to distinguish between cavitation and bronchiectasis in reinfection tuberculosis, and it is worth remembering that some patients present with a productive cough due to pulmonary tuberculosis, overcome that disease, and are left with a productive cough due to bronchiectasis.

REFERENCES

- CAMERON, H. C., and DE NAVASQUEZ, S. (1936): *Guy's Hosp. Rep.*, **86**, 366.
ELIASBERG, H., and NEULAND, W. (1920): *Jahrb. f. Kinderheilk.*, **93**, 88.
ELIASBERG, H., and NEULAND, W. (1921): *Jahrb. f. Kinderheilk.*, **94**, 102.
ERWIN, G. S. (1939): *Brompton Hosp. Rep.*, **8**, 43.
FRIEDENBERG, W. (1926): *Z. Kinderheilk.*, **40**, 493.
HUTCHISON, J. H. (1949): *Glasg. Med. J.*, **30**, 271.
JONES, E. M., PECK, W. M., WOODRUFF, C. E., and WILLIS, H. S. (1950): *Amer. Rev. Tuberc.*, **61**, 387.
MACGREGOR, A. R., and ALEXANDER, W. A. (1937): *Edin. Med. J.*, **44**, 561.
MORLOCK, H. V., and PINCHIN, A. J. S. (1933): *Lancet*, **1**, 1114.
OPPENHEIMER, E. H. (1935): *Johns Hopk. Hosp. Bull.*, **57**, 247.
PARSONS, L. G. (1934): *Lancet*, **1**, 1101.
RILANCE, A. B., and GERSTL, B. (1943): *Amer. Rev. Tuberc.*, **48**, 8.
SPENCE, J. C. (1932): *Arch. Dis. Childh.*, **7**, 1.
TANNENBERG, J., and PINNER, M. (1942): *J. Thorac. Surg.*, **11**, 571.
WALLGREN, A. (1926): *Acta radiol., Stockh.*, **7**, 595.

BRONCHOGRAPHY WITH A SUSPENSION OF SULPHANILAMIDE IN IODISED OIL

BY H. G. H. HOUGHTON AND J. H. ROLLAND RAMSAY

From the Royal Victoria Hospital, Edinburgh

THE place of bronchography in the diagnosis of chest diseases is well established. The procedure has, however, one main disadvantage, in that when iodised poppy-seed oil is used some degree of alveolar filling frequently occurs. Once this has happened the oil cannot be removed by posturing or other means. Alveolar filling is undesirable for the following reasons:

(1) Radiograms taken weeks or months afterwards show the oil retained in the lung, thus interfering with interpretation. This is particularly undesirable in cases of pulmonary tuberculosis.

(2) The interpretation of alveolograms is much more difficult than the interpretation of bronchograms. For example, it is possible for a bronchiectatic area to be obscured by the curtain effect of excessive alveolar filling.

(3) There may be interference with subsequent X-ray therapy in certain cases of neoplasm.

(4) There may be toxic sequelæ due to retained foreign substances (iodism and pneumonia).

No originality is claimed for the technique here described, which, as far as we know, was first used by Dormer at the King George V Hospital, Durban (Dormer *et al.*, 1945). He experimented with suspensions of various chemotherapeutic substances in lipiodol in the treatment of cases of non-traumatic pulmonary sepsis. He found that bronchograms made by using a suspension of sulphanilamide in lipiodol were superior to those in which lipiodol alone was used, in that alveolar filling seldom occurred (Dormer and Wiles, 1947). Despite the simplicity and obvious advantages of using a thick medium, it has not yet been widely adopted in this country. We have no experience of the water-soluble agents, but as iodised oils are still generally used we feel justified in describing this method.

Technique

The quantity of thickening agent must depend on the viscosity of the particular preparation of iodised oil. We use neohydriol (viscous). To 20 c.c. of this oil we add 10 gm. of sulphanilamide, finely powdered and thoroughly mixed with a sterile mortar and pestle. Immediately before use the suspension is warmed gently and again thoroughly stirred. Excessive heat or failure to mix will allow the oil to separate out, thus defeating the object of the procedure.

The method of introducing the opaque medium is largely a matter of individual preference. We use the supra-glottic method. Following premedication with nembutal (gr. $1\frac{1}{2}$ is a suitable dose for the average adult), anaesthesia of the pharynx and larynx is obtained by means of a 5 per cent. solution of cocaine hydrochloride in a de Vilbis spray. If the patient inhales deeply and

leans towards the side to be investigated sufficient anaesthetic solution will pass through the vocal cords to anaesthetise the trachea and main bronchus.

Using a 20-c.c. syringe fitted with 6 inches of soft rubber tubing, the medium is dropped blindly over the back of the tongue, which is held firmly forward. While this is being done, the patient is seated and inclined towards the side under investigation at an angle of approximately 45 degrees. A total of 10-15 c.c. of the suspension is usually sufficient for one lung. Filling of the segmental bronchi is obtained by placing the patient in the positions usually described. A tilting table is an asset here. Owing to the thickness of the medium this part of the procedure takes longer than normal. We find it takes 4-8 minutes to outline all the bronchi of one lung.

As soon as satisfactory bronchograms have been obtained the patient is encouraged in gentle postural coughing, preferably under screening control.

Discussion

We find that by the above method we obtain satisfactory bronchograms without alveolar filling. Furthermore, the larger bronchi are outlined rather than filled, thus rendering interpretation easier. Also, in cases of severe bronchiectasis or lung abscess, bronchography by this method has a temporary beneficial effect. In most cases the lung is radiologically clear of iodised oil within a week, and frequently within a few hours.

Dormer has demonstrated the value of bronchography in revealing unsuspected bronchiectasis as a source of positive sputum in pulmonary tuberculosis. We feel that such cases should be treated by resection, which in good hands is now a safe operation (Bickford *et al.*, 1951).

There can be little doubt that many patients who are at present subjected to thoracoplasty would, in the light of further investigation by bronchography, be considered more suitable for resection.

The recognition of tuberculous bronchiectasis as a clinical entity emphasises the desirability of bronchography taking its place alongside bronchoscopy in the investigation of cases of pulmonary tuberculosis. We have seen no ill-effects from the use of this method; we have, in fact, in one case confirmed Dormer's finding that the positive sputum of certain patients with tuberculous bronchiectasis becomes negative following bronchography.

We have had no cases of iodism or other complications, but we insist that each patient has an iodine and cocaine sensitivity test before bronchography is attempted.

The illustrations demonstrate the quality of bronchogram and the degree of clearing that can be obtained using this method. Screening examination showed that most of the clearing had, in fact, occurred within an hour of the commencement of postural coughing.

Fig. 1 shows a bronchogram of a normal right lung. A tuberculous lesion is seen in the second left anterior interspace.

Fig. 2 shows a postero-anterior radiogram of the same patient taken nine days later.

Summary

A safe and simple method of bronchography using a suspension of sulphanilamide in iodised oil is described. The advantages of the method and its rôle in the investigation of cases of pulmonary tuberculosis are discussed.

REFERENCES

- DORMER, B. A., FRIENDLANDER, J., and WILES, F. J. (1945): *Amer. Rev. Tub.*, **51**, 62.
DORMER, B. A., and WILES, F. J. (1947): *Clin. Proc.*, **6**, 10.
BICKFORD, B. J., EDWARDS, F. R., ESPLEN, J. R., GIFFORD, J. H., MAIR, A. M., and THOMAS, O. F. (1951): *Thorax*, **6**, 25.
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A mixture for a Consumption.

But the Specifick which transcends all the Medicines for a Consumption here mentioned, and many others besides, is the Herb Fox-Glove. . . . I have known it do wonders, and speak here from a long Experience: Persons in deep Consumptions, and given over by all Physicians, have by the use of this Herb been strangely recovered, and so perfectly as to grow fat again, I commend it as a Secret, and it ought to be kept as a Treasure: These few Lines concerning this matter alone, is worth ten times the price of the whole Book, were there nothing else in it besides that one had occasion to make use of. I am very confident of it, the deplorable wasted Patients, who have been in long and tedious Consumptions, Phthises, and Hecticks, if they make use of it, will give me thanks for this Notice, whilst they may have reason enough to Curse even the Memories of the Quacking Bloodsuckers, who as they have drain'd them of a good part of their Estates, would by a continuance under their Hands (for all their specious Methods of Cure) have fool'd them out of their Lives too.

WILLIAM SALMON: *The Family-Dictionary; or, Household Companion*, 2nd ed., London, 1696, pp. 61-2.

PLATE XIX.

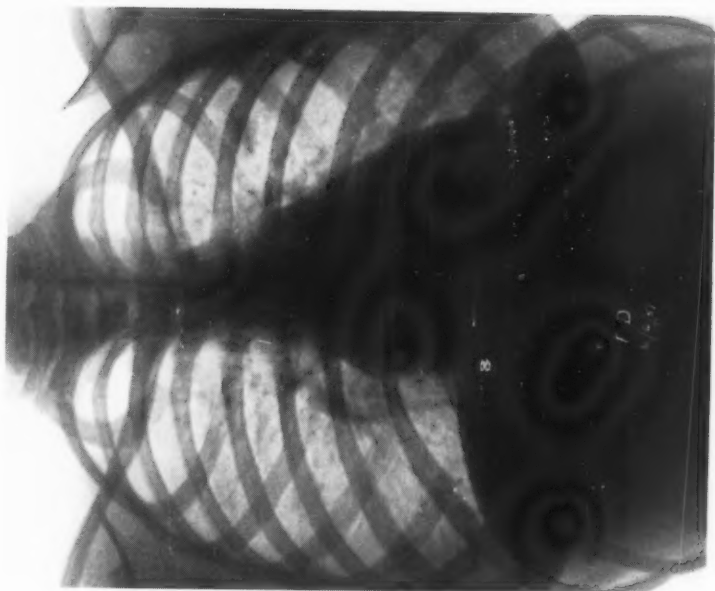


FIG. 2.

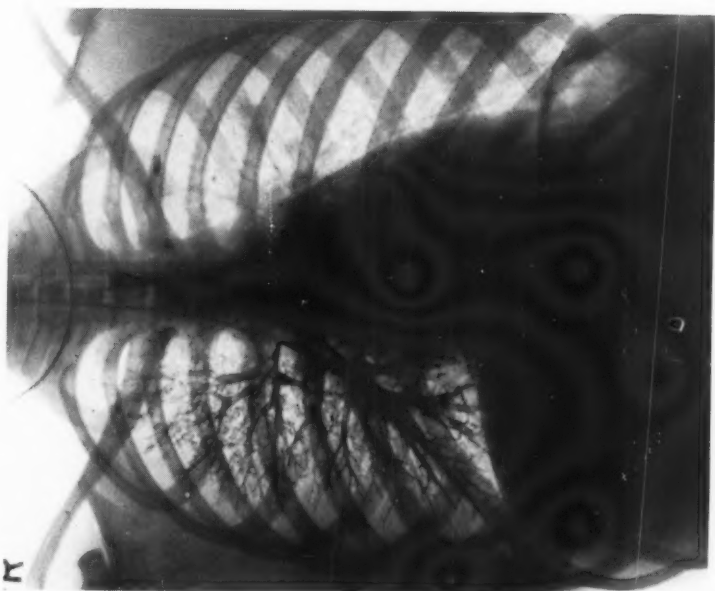


FIG. 1.

PLATE XX.

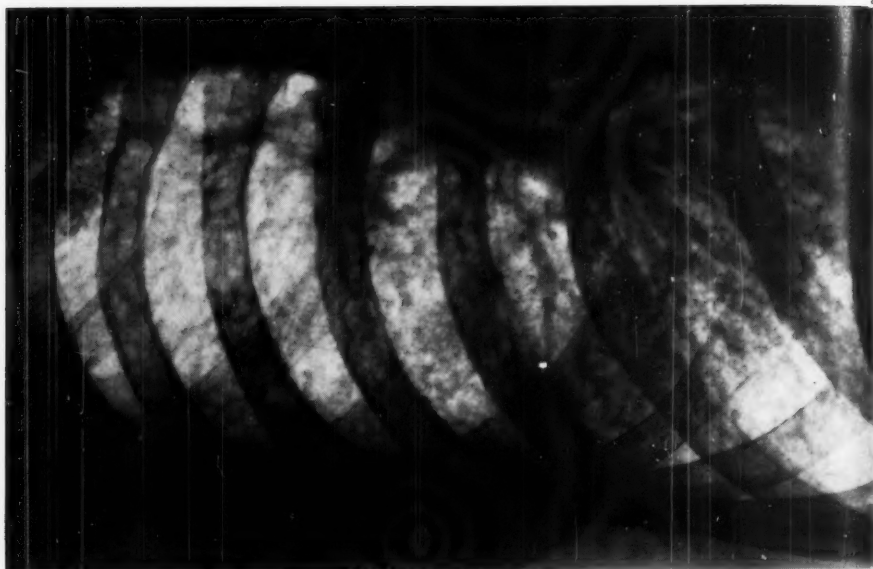


FIG. 4.—47-YEAR-OLD CUDOLA PATCHER.

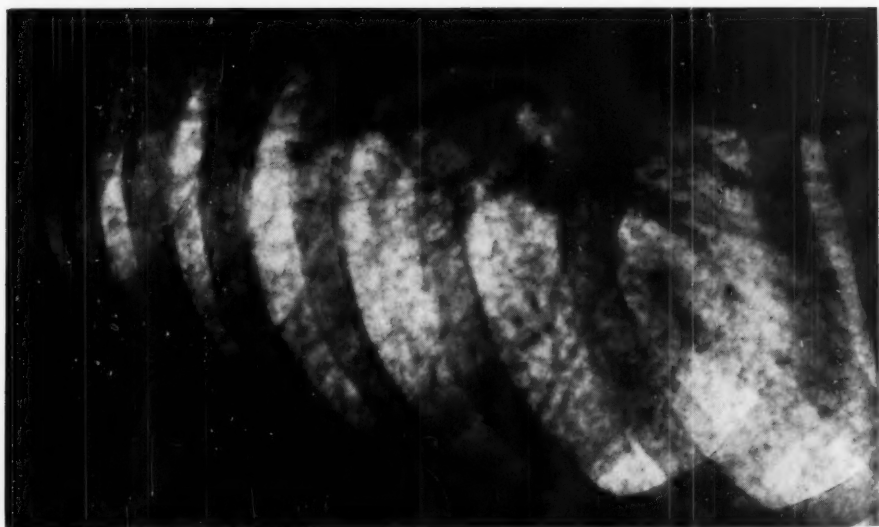


FIG. 3.—51-YEAR-OLD VESSEL REPAIRER.

PNEUMOCONIOSIS IN STEEL WORKERS

BY JOHN ASPIN AND A. F. SHIRRAS

From the Leeds Chest Clinic

Co-operation between Chest Clinics and Works Medical Officers can minimise the dangers due to the silicosis risk in iron and steel foundries.

Men who have worked for a long time in risky occupations in a local steel foundry are referred a few at a time for examination at the Leeds Chest Clinic. When suspicious radiological abnormalities are found, the Chest Physician does not content himself with the taking of an industrial history. Encouraged by the management, he goes along to the foundry with his colleague and makes himself familiar with the processes involved. He studies the layout of the shops and tries to find out how conditions have changed during the working lifetime of present employees. The importance of these investigations can be shown by reference to a single case. An arc-welder's skiagram showed nodulation radiologically consistent with advanced but harmless siderosis (Doig and McLaughlin, 1948). It turned out that this man had worked for sixteen years in a dusty corner of the fettling shop, and that until recently a sand-blasting machine had been in operation quite close to him. After discussion with the Works Medical Officer, it was decided that an appreciable amount of the nodulation must be due to silica deposits rather than siderosis, and the man was given appropriate advice.

The two men who form the main subject of this paper have both worked in the steel-making shop, where scrap is melted in cupolas and converted to steel in Bessemer vessels (tropenas). The risky jobs in this process are those of cupola patcher and vessel repairer, and it will be as well to give a brief description of these occupations.

Fig. 1 shows two cupolas, one in use, the other being repaired. After the molten iron has been run off, the cupola is allowed to cool. Then the cupola patcher goes inside and brings down defective parts of the fused siliceous refractory lining with pneumatic tools. During this operation the still hot cupola ventilates strongly upwards, so that dust falling to the floor is constantly being disturbed and swept upwards during the workman's movements. After this stripping the gaps in the lining are repaired with wet materials. After several meltings, the whole lining is knocked down and rebuilt.

Fig. 2 shows iron being converted to steel in two Bessemer vessels (tropenas). The molten iron is ladled in and a powerful blast of air or oxygen is sent through the tuyeres. Suitable amounts of other metals are added by the steel-maker, and when the correct proportions of carbon, silicon, etc., have been oxidised away, the steel remaining in the vessel is poured off for use in the foundry. The refractory lining of the Bessemer vessels is siliceous, and, like the cupola lining, it has to be repaired. Ultimately it must be knocked down and rebuilt. Both cupola patchers and vessel repairers run a silicosis risk.

Fig. 3 shows part of the chest skiagram of a 51-year old man of very good

physique. When first examined he said he could run as far and as fast as any man of 50. There was a history of occasional cough and sputum. Apart from a rather emphysematous chest there was no clinical abnormality. After about ten years' work as a machine moulder he worked as a vessel repairer, a job which he held for nineteen years. Originally he had used a hammer and chisel, but thirteen years ago he began to use pneumatic tools. At that time masks were supplied, but it is reported that they were not often worn. Four years ago improved masks were provided and used to a certain extent. On the average, this man has been exposed to serious risk for two days a week for nearly twenty years.

Fig. 4 shows part of the chest skiagram of a 47-year old man of excellent physique who said that he could work twice as hard as he did. There was no dyspnoea, and the clinical findings were normal. To begin with he had

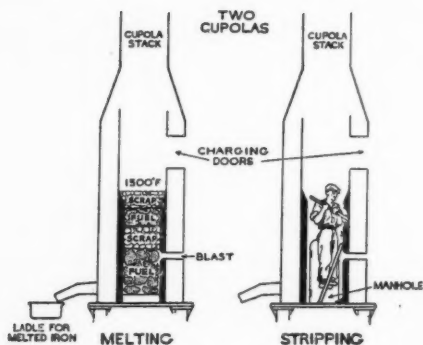


FIG. 1.—CUPOLAS FOR SCRAP-MELTING

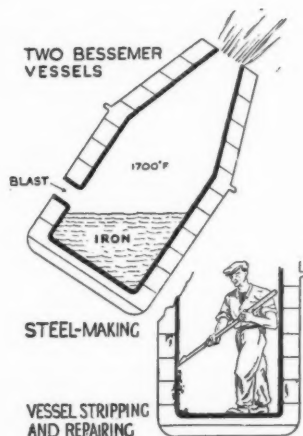


FIG. 2.—STEEL-MAKING IN BESSEMER VESSELS (TROPENAS)

worked for seven years as vessel repairer's mate with the previous case. Then he began to work as the cupola patcher. During the six war years he had five or six hours' exposure six or seven times a week. In 1946 he began to wear an improved type of mask, and worked shorter hours.

Both skiagrams show evidence of pneumoconiosis in the early nodular stage. Although in the second case there was a healed primary tuberculous complex, and some degree of localised left basal emphysema, neither case showed any evidence of active pulmonary tuberculosis.

What was done about these findings? The private practitioners were told that their patients were suffering from early pneumoconiosis and were asked to furnish certificates which could be taken to the Ministry of National Insurance in order to initiate claims for industrial compensation. It is interesting to note that the Silicosis Tribunal assessed the first case as having 10 per cent. disability, and the second as having 5 per cent. disability.

The employers, realising that the men's work had led to the development

of disease, offered them alternative employment without material loss of income. Attention was then turned to the hazards of their former jobs. The new vessel repairer has been given a helmet respirator with an air-line, which, if worn, should make his job reasonably safe. The cupola patcher has been given a similar helmet, and attempts are still being made to reverse the draught through the cupola during stripping, so that silica dust will be blown out of the bottom of the cupola instead of rising as the workman moves about.

As yet, a fundamental solution of the problem has not been achieved, for it is impossible to devise an economical but harmless refractory lining which will stand up to the high temperatures involved. One can only hope that this technical difficulty will soon be overcome, for in the long run protection through equipment worn by operatives is rarely a satisfactory solution.

Summary

Two cases are described in which pneumoconiosis has developed in a cupola patcher and a vessel repairer engaged in the steel-making process.

Acknowledgments

It is a pleasure to acknowledge the enthusiastic help and co-operation of Messrs. Cattons, Steel Founders, in investigating the problems discussed in this paper.

REFERENCES

- DOIG, A. T., and McLAUGHLIN, A. I. G. (1948): *Lancet*, **1**, 789.
McLAUGHLIN, A. I. G. (1950): "Industrial Lung Disease of Iron and Steel Foundry Workers," London, H.M.S.O.
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MULTIPLE PATHOLOGY IN A CASE OF PULMONARY TUBERCULOSIS

By J. H. P. JOHNSON

From the East Ham Chest Clinic and the Plaistow Hospital Chest Unit

A MARRIED woman, aged 52, attended East Ham Chest Clinic in February 1950 complaining of cough for four weeks, productive of small quantities of sputum which had been bloodstained for one week. She was admitted to the Plaistow Hospital Chest Unit under the care of Dr. Philip Ellman.

Previous history: In 1939 she developed diabetes, which was not well controlled and became complicated by retinitis, the fundi showing numerous small hæmorrhages and slight exudates near both discs. Ten months after the diabetes was discovered she was found to have indolent ulcers on both feet, a faint red papular rash on the back, slight irregularity of the pupils, absent ankle jerks and positive Wassermann and Kahn reactions.

The ulcers on the feet healed during a full course of anti-syphilitic treatment (arsenic and bismuth, presumably), and the diabetes was stabilised by diet and insulin.

In 1943 she developed gangrene of the left foot, which had to be amputated. Histology of the dorsalis pedis artery showed fibrosis of the media and atheroma of the intima. By this time the retinitis had advanced, so that she was nearly blind.

In April 1949 carcinoma was discovered in her left breast, for which a radical mastectomy was performed, deep X-ray treatment being given before and after the operation. At that time the Wassermann reaction was found to be negative and the diabetes was only partially controlled, her attendances at the diabetic clinic having been intermittent. X-ray of her chest showed an ill-defined 2-cm. opacity in the second right interspace. She failed to attend as an out-patient and was next seen at East Ham Chest Clinic in February 1950.

Clinical examination revealed the following findings: General condition, fair; weight, 7 st. 11½ lb. She was almost blind, due to a right-sided cataract and advanced diabetic retinitis in the left eye. There were widespread spider nævi on her face, neck, upper part of the chest and on the arms; the skin of the left chest anteriorly showed a mastectomy scar and post-irradiational changes.

There were moist sounds at the left apex and in the left infraclavicular region and there was a systolic bruit in the pulmonary area. The liver was palpable a finger's breadth below the costal margin, and the spleen was easily felt and firm. Other features were clubbing of the fingers, a low-grade pyrexia and a regular tachycardia (120/minute). Blood pressure 180/80.

Investigations.—X-ray chest: Indefinite loss of translucence in the left upper zone with cavitation and some streaky shadows extending to the hilum. Scoliosis with slight rotation of the heart and prominence of the pulmonary artery shadow. The opacity seen in the right upper zone in April 1949 was unaltered.

Sputum examination: Positive for tubercle bacilli.

E.S.R.: 80 mm./1st hour.

Wassermann and Kahn tests: Negative.

Urine: Sugar ++

Liver functions tests: Thymol turbidity 18 units.

Colloidal gold reaction 5 +

Serum albumin 2.5 gm. per cent.; serum globulin
3.5 gm. per cent.

Congo Red test: Negative.

Red and white cell counts and hæmoglobin: Normal limits.

Course and Treatment.—Treatment for the tuberculosis was by rest in bed in hospital for three months, followed by two months in a sanatorium together with a course of streptomycin (1 gm. intramuscularly daily) and P.A.S. (3 gm. five times daily) for 100 days and 140 days respectively. On this régime she improved symptomatically, became afebrile, gained 9 lb., and the E.S.R. fell to 19 mm. in one hour. Radiologically there was some resolution in the left upper zone, but the cavity remained patent and the sputum was persistently positive.

The diabetes was finally stabilised on soluble insulin 56 units mane and 40 units nocte, and a diet arranged so as to give her 200 gm. carbohydrate daily as follows: breakfast 50, mid-morning 20, lunch 30, tea 20, supper 50, and bedtime 30.

The position at the present time is that the diabetes remains stabilised and the tuberculous lesion, though not quiescent, is stationary.

Comment.—The multiplicity of lesions in this unfortunate patient was considered remarkable enough to warrant publication. The diabetes appears to have been the most damaging factor, having led to almost total blindness and being largely responsible for gangrene of the foot which necessitated amputation. It probably also predisposed her to tuberculosis, and may have played a part in producing cirrhosis of the liver.

The presence of three of the "Big Four" of pathology—viz., syphilis, cancer and tuberculosis—in the same patient must be rare; the further combination with diabetes (complicated) and cirrhosis of the liver must be well-nigh unique.

The diagnosis of cirrhosis of the liver seems certain on clinical grounds (viz., enlarged liver and spleen, and spider nævi), and is supported by the biochemical findings of a reversed albumin-globulin ratio and the thymol turbidity and colloidal gold reactions. There was no previous history of jaundice and the etiology remains obscure, possible factors being arsenotherapy, irradiation or syphilis, which was in the tertiary stage before treatment was instituted. The cirrhosis may have been a sequel to a sub-clinical virus hepatitis, possibly introduced during arsenotherapy, or the diabetes may have been contributory by virtue of fatty infiltration as indicated by Dible (1951).

I am indebted to Dr. Philip Ellman for his help and permission to publish this case which was under his care.

REFERENCE

DIBLE, J. H. (1951): *Brit. Med. J.*, 1, 883.

REVIEWS OF BOOKS

Textbook of Medicine. Edited by R. L. CECIL and R. F. LOEB. Philadelphia and London: W. B. Saunders and Co. 8th Edition. 1951. Price 60s.

This 8th Edition makes a slight departure from its predecessors in so far as its senior editor, Professor Cecil, has had the services of Dr. R. F. Loeb as co-editor in addition to a group of associate editors. This team has succeeded in integrating the work of several authoritative contributors who constitute a representative cross-section of American medicine. While the approach may be somewhat different from our own, it certainly assists in widening our outlook.

Discussions on the various systems do not attempt to be comprehensive treatises, but each subject is approached on a broad basis and covers, where relevant, the physiological, biochemical and psychological aspects. Those interested in diseases of the chest will find a novel contribution on pulmonary function in health and disease, the pneumonias, the rickettsias including Q fever, the pneumomycoses, pulmonary involvement in the collagen diseases, beryllium poisoning with particular reference to pulmonary involvement, etc. There are interesting chapters dealing comprehensively with diseases of the bronchi, diaphragm, mediastinum and pleura. As far as the lungs are concerned circulatory disturbances, atelectasis, pulmonary abscess, fibrosis, atherosclerosis and emphysema receive up-to-date and adequate consideration.

In view of the increasing importance of "new growths of the lungs" and "the pneumokonioses" we feel that their clinical significance calls for additional space even in a book of this nature.

The chapter on tuberculosis is confined to the section of "infectious diseases." Although it is indeed comprehensive, one may question whether "pulmonary tuberculosis" would not be better considered among "diseases of the respiratory tract." This apart, the subject is well surveyed in the light of the most modern developments, and is well illustrated. Moreover, the author's choice for dealing with this subject may have the advantage of emphasising the so frequently neglected systemic nature of the disease.

Again, it is questionable whether "asthma" should come into the chapter on allergy instead of, as in most English text-books, being discussed among diseases of the respiratory tract.

The book is very well produced on the good-quality paper which is a *sine qua non* of American book production, free from the restrictions current in this country. The illustrations scattered through the volume, including some excellent colour plates, enhance its value, and the references to the literature at the end of each chapter are much to be commended where the reader seeks further information on a particular subject.

P. E.

The conference on European B.C.G. Programmes conducted with the assistance of the Joint Enterprise, Copenhagen, Denmark, September 8 to 12, 1949. Issued by the International Tuberculosis Campaign. London: William Heinemann Medical Books Ltd. 1951.

THE material presented at the conference on European B.C.G. programmes has now been issued in convenient printed book form in order to meet a heavy

demand. It fulfils the hope of the Director of the International Tuberculosis Campaign, Dr. Johannes Holm, in giving a full picture of the problems and achievements in the B.C.G. programmes conducted with the assistance of the Joint Enterprise, and should be of the greatest interest to tuberculosis workers everywhere.

The conference was attended by representatives from the World Health Organisation, the International Tuberculosis Campaign, UNICEF, and by leading authorities on tuberculosis from Scandinavian and other European countries.

The early chapters are devoted to an account of the Joint Enterprise and of the other participating bodies and give details of the organisation that has been evolved to put the B.C.G. programme into effect. This is followed by reports of the progress made by individual countries (Greece, Austria, Poland, Yugoslavia, Czechoslovakia and Finland) and several special reports on clinical, laboratory, research and statistical aspects of the work of a more comprehensive and specialised nature.

Of particular interest are the special reports by Dr. H. J. Ustvedt on the Technique of Tuberculin Testing, the Local Reaction in B.C.G. Vaccination, and Tuberculous Disease in B.C.G. Vaccinated Individuals. The accumulated evidence, including the literature, is discussed and reviewed and throws light on such unsettled questions as the selection of those who should be vaccinated, the necessity of preliminary tuberculin testing and the best ways in which this may be done, whether B.C.G. can produce any harmful effects, the ideal dosage of B.C.G., the extent of the immunity conferred by it, and the significance of tuberculin testing after vaccination.

Properly controlled observations and statistically significant material will be needed before any definite conclusions are reached, but some interesting preliminary observations have been made, such as the increased sensitivity of the patch test as compared with intradermal tests after B.C.G. vaccination. Of considerable practical interest would be further information on the diagnostic B.C.G. reaction, B.C.G. Tuberculin, and the value of the reaction at the vaccination site as the criterion of successful vaccination instead of further tuberculin tests.

The progress towards the ultimate aim of total vaccination of the "susceptibles" in the various countries is impressive, and one of the outstanding features is the extreme rarity of any serious or harmful reactions to B.C.G. vaccination.

Second Annual Report of the International Tuberculosis Campaign, July 1, 1949, to June 30, 1950. Issued by the International Tuberculosis Campaign. London: William Heinemann Medical Books Ltd. 1951.

The second report surveys the work of the International Tuberculosis Campaign during the period. A good deal of space is given to Headquarters Reports concerning organisational matters, which should be interesting and helpful in countries where the initiation of a mass B.C.G. vaccination scheme is contemplated. The remainder of the report—Field Operations—gives an account of mass B.C.G. vaccination in the individual participating countries in Europe, North Africa, Middle East, Asia and Latin America. The reports from the European countries are best studied in conjunction with the previous reports published in "The Conference on European B.C.G. Programmes conducted with the Assistance of the Joint Enterprise—Copenhagen, Denmark

—September 8 to 12, 1949." The progress made up to the time of this report seems to have been well maintained.

Further progress, particularly in the non-European countries, should be expected when plans for training personnel and for producing B.C.G. locally under standardised and controlled conditions are brought to fruition.

J. H. P. J.

Tuberculosis among Children and Adults. By J. ARTHUR MYERS, M.D., Ph.D.
Third edition. Oxford; Blackwell Scientific Publications. 1951. Pp. 894,
177 figs. Price £4 15s. net.

This is the third edition of Dr. Myers's book, which appeared first in 1930 under the title of *Tuberculosis among Children*, and its scope has now been expanded to cover the span of life. The theme of this greatly enlarged edition is that tuberculosis is an infectious disease, that primary infection may remain active for a lifetime, that allergy is the dangerous outcome of what is otherwise a benign process, that when allergy is established the infected person lives in the shadow of dangerous re-infection types of disease, in which category Dr. Myers includes miliary tuberculosis, tuberculous meningitis, and other conditions which are not usually included in this term. The logical development of this outlook is that tuberculin testing must be universal with a view to detecting infection, and that the detection of infection must lead to a detailed search for its source. The problem of tuberculosis is in fact infection and the social aspects of the disease are not even discussed. The book has been elaborated on this theme, and while it contains a great deal of useful information on tuberculin surveys, and while each chapter has a very extensive bibliography which makes it valuable for reference purposes, one is left with a feeling of elusiveness as if the author were all the time failing to give a complete picture of the problems of the disease.

There is much in medicine which is controversial and tuberculosis is no exception, but there is an air of finality about many of Dr. Myers's statements which will not be shared by others. We can respect his views and still hold to our own. In this country we are neither all for, nor all against, B.C.G., and while many of Dr. Myers's arguments against it are sound, many are not likely to find acceptance. The truth is that those of us here who support the use of B.C.G. have quite clear views on what we expect it to do, and we believe that it fits into our tuberculosis schemes without excluding or replacing any part of them.

While there is much which is good and stimulating in this book there is much which is neither. There is a tendency, for example, to deal with problems of treatment in a general manner which is not specially helpful, and some of the chapters, such as that on other forms of tuberculosis in infancy and tuberculosis of the bones and joints, are of little help to anyone who is reading with a view to learning. In fact the discursiveness of many of the chapters becomes irritating. Perhaps even more so is the repetition from chapter to chapter of statements already made and views already discussed.

Dr. Myers writes from an American angle, and his descriptions of the tuberculosis position in his country are extremely interesting even if they are not applicable to this country.

The book is beautifully printed and produced, but many will find the price high.

C. C.

Pneumoconiosis: Beryllium—Bauxite Fumes—Compensation. Leroy U. Gardner Memorial Volume. Edited by A. J. VORWALD, M.D., with the collaboration of M. BOWDITCH, A.B., T. M. DURKAN, M.E., and T. C. WATERS, LL.B. Sixth Saranac Symposium. New York: Paul B. Hoeber Inc., 1950. Pp. 659, 196 figures. Price \$7.50.

The story of beryllium and the pulmonary diseases which it is said to cause is one of the strangest and most contradictory in the whole of occupational medicine. This book is a full account of the sixth Saranac Symposium held in 1947 at Saranac Lake, N.Y., when beryllium, Shaver's disease and compensation were discussed.

Beryllium is one of the lightest and strongest of metals and has many uses in industry. When alloyed with other metals it imparts to them such desirable qualities as increased strength, ductility, conductivity and resistance to heat and corrosion. It also has a place in the production of atomic energy. In the extraction of the metal from the ore, cases of acute pneumonitis arise, usually from inhalation of the dust or fumes of beryllium fluoride or sulphate. A delayed or chronic pulmonary granulomatosis is caused by exposure to the dust of zinc beryllium silicate, which in powder form is used to coat the insides of fluorescent lamp tubes. It is said that the chronic disease is seen sometimes in the extraction processes and that occasionally the acute pneumonitis goes on to granulomatosis. The evidence for this in the published reports is not very convincing, because the occupational histories and environmental studies are not given in enough detail. Little is known about the precise physical and chemical state of zinc beryllium silicate, or whether it contains crystalline free silica, but it is likely that in the differential diagnosis an atypical form of silicosis will have to be considered more seriously than it has been up to the present time. It has not yet been possible to reproduce the condition in animals, though Vorwald has nearly succeeded in doing so. The disease apparently occurs only in susceptible people, and strange "neighbour" cases have occurred in people living near but not working in the factories. The early cases were variously diagnosed as Boeck's sarcoidosis or miliary tuberculosis. The typical X-ray picture of the lungs is associated with marked loss of weight and dyspnoea, and there is usually an interval of about three years between exposure and the onset of symptoms. Theoretically, both the acute and chronic illnesses could be explained without invoking the aid of beryllium, and indeed some research workers have reported that the beryllium ion is not toxic. But, as this book shows, most American observers are prepared to accept beryllium as being partly, if not wholly, the cause of both the acute and chronic diseases. The evidence for and against beryllium is set out in great detail, and it is clear that final conclusions cannot yet be drawn.

Shaver's disease is another strange pulmonary illness which occurs in workers exposed to the fumes of bauxite, and is characterised by gradually increasing dyspnoea after about three years' exposure. In many cases spontaneous pneumothorax takes place, and a widely distributed fine interstitial fibrosis is found at autopsy. The fumes, which are of fine particle size (0.5 to 0.02 micron), consist of alumina and silica, both apparently in the free state, but the specific causative agent has not yet been identified. The book, which is an elegant production, is the memorial volume to the late Dr. Leroy U. Gardner, whose outstanding work on the pathology of tuberculosis and the occupational lung diseases is well known.

A. I. G. M.

La Trachée et les Bronches Cartilagineuses. Structure et Fonctionnement des Dispositifs Musculaires et Élastiques. By M. BARIETY, J. PAILLAS and Mlle. M. LEVY. Masson et Cie. Pp. 237, 57 illustrations.

The authors have spent several years in the study of diseases of the bronchi and lungs, and they have devoted special attention to the normal structure of the bronchial system, with a view to better understanding of function in health and disease.

This research was stimulated in the first place as a result of the bronchoscopic study of material removed for biopsy, and they have made a special study of the appearances of certain portions of the bronchial system, notably the posterior surface of the bronchi, the mucous membrane, the bronchial muscles, and the complicated system of elastic tissue which is distributed in the walls of the bronchi. In this book they have limited their observations to the trachea and the cartilaginous portions of the bronchi, and they deal only with the muscle and elastic tissue, omitting all mention of the mucous membrane. Their observations appear to relate mainly to the normal disposition of the bronchial structures and there is little reference to the changes which happen as a result of disease or degeneration. It would be thought that the vascular supply of the bronchi is an essential feature of any description of the microscopic anatomy, yet this interesting and important aspect of the subject has not been considered.

A large part of the book is devoted to a consideration of bronchial movement during respiration and on coughing. The conclusion is that the bronchi dilate on inspiration and retract on expiration.

The book is adequately illustrated and the photomicrographs are reasonably well reproduced; they illustrate the points which the authors wish to make. There is an extensive bibliography.

One reads this book with a certain amount of wonder at the amount of detailed knowledge which we possess about the minute structure of the walls of the bronchi, but one is not left with a feeling that this knowledge is at present capable of being applied in a useful manner to clinical medicine or surgery. The book is likely to be useful for reference by those who wish to verify points on the normal structure or function of the bronchial system. Its price (1,500 francs) appears to be out of proportion to its value.

J. M.

BOOKS RECEIVED

Treatment of Asthma. Edited by H. A. Abramson, M.D. Baillière, Tindall and Cox. Pp. xiv+752, with 90 figures. Price 84s. net.

Tuberculosis Index. Quarterly. June 1951, Vol. 6, No. 2. National Association for the Prevention of Tuberculosis.

The Electrocardiogram in Pulmonary Tuberculosis. Allan Björkman. Stockholm, 1951.

Arquivos da Universidade da Bahia. Faculdade de Medicina. Vol. V, 1950. Salvador, Bahia, Brasil.

Traité de Médecine. Tome III. Paris: Masson et Cie. 1951.

REPORTS

ST. ULTAN'S HOSPITAL, DUBLIN

A REPORT from the National B.C.G. Committee of St. Ultan's Hospital, Dublin, for the period July 1949 to December 1950 deals in general with the National B.C.G. Committee's vaccination campaign in Ireland from the commencement in July 1949 until December 1950. During this eighteen-month period approximately 34,800 preliminary tuberculin tests were done; 18,693 individuals were vaccinated with B.C.G., and of these 14,743 had matured and had received post-vaccinal tuberculin tests before the close of the period. The majority of the remainder were still in their post-vaccinal pre-allergic period and therefore would not be due for post-vaccinal testing until the new year. The vaccinated group has been analysed according to area, age-group, sex and institution. The post-vaccinal conversion rate has been analysed according to sex and age-group and a final conversion rate of 95.16 per cent. has been found. The report is signed by Dr. J. St. P. Cowell, Medical Director, and Dr. R. A. Q. O'Meara, Chairman.

CITY OF DURBAN

THE ANNUAL REPORT of the City Medical Officer of Health, City of Durban, has been made for the year ending June 30, 1950. Among his observations on tuberculosis, the City Medical Officer states that a study of the statistics shows that the total death-rate per 1,000 of the population has, during the last five years, steadily declined from 11.05 in 1946 (the last census year) to 8.52 in 1950. Further, this is the second consecutive year in which the death-rate has declined simultaneously in each of the four races concerned.

This progressive improvement, the City Medical Officer considers, is highly gratifying and may be regarded as the result of:

- (a) Intensive control measures adopted during recent years in Durban jointly by this local authority and by the Tuberculosis Division of the Union Health Department; and
- (b) Steady improvement in working conditions and living standards, especially nutrition in the case of industrially employed natives.

As far as age-groups are concerned, the incidence is highest in the group 26-45 years in all races, except Indians, whose maximum, as during the previous year, occurs in the 16-25 year group. The greatest number of deaths from tuberculosis occurred as before, at a later age in Europeans than in the three non-European groups.

With regard to the incidence of tuberculosis in the various occupations, in Europeans and in coloureds, it is noted that the occupational groups chiefly affected were housewives and labourers.

The low prevalence of tuberculosis among Durban Europeans rules out the subtropical climate with its trying heat and humidity in summer, as a factor in the etiology of tuberculosis locally.

The basic environmental factor is urbanization of the non-European races, who suffer heavily in the process of adjustment from conditions of their

primitive origin to those of a modern industrial city. Overcrowding, fatigue, lack of rest, poor feeding, lack of recreation and a low living standard generally combine to create conditions ultra-favourable to the spread of tuberculosis.

Important contributory factors are the belated discovery of "open" cases and the rapidity with which the minimal stage of pulmonary lesions is succeeded by the "open" or infectious stage. In this connection, the shortage of bed space and the reluctance of natives, particularly, to remain in hospital are to be noted as important.

The problem of tuberculosis among non-Europeans is largely a socio-economic problem, soluble in terms of improvement in their living environment, their advance to a higher earning capacity and higher standards of living—better housing, nutrition, education and recreation.

Medical aspects of the problem relate to:

- (a) The progress of primitive peoples toward a higher-level immunisation against the infection;
- (b) Improved case-finding as a precursor to:
 - (i) efficient isolation of "spreaders";
 - (ii) removal of cases in the early stages from work and fatigue.

TORONTO HOSPITAL (FOR TUBERCULOSIS) 1950

WE have received the annual report for 1950 of the Toronto Hospital (for Tuberculosis), Weston, Ontario. It covers all aspects of Sanatorium administration and includes clinical and statistical reports from the various departments. The most interesting from the clinician's point of view is the last section, where recent trends in the treatment of tuberculosis as practised at the Toronto Hospital are set forth.

This hospital of 663 beds, equipped for the complete treatment of all forms of tuberculosis, is closely linked with the University of Toronto.

The salient features of the concluding section on modern trends at the hospital are:

1. Bed-rest with or without pneumoperitoneum is being used increasingly in place of artificial pneumothorax. It is followed by thoracoplasty when indicated.
2. Tuberculomas not clearing with bed-rest are treated by lobectomy or pneumonectomy.
3. Extrapleural pneumothorax has not been used during the past five years, but apicolysis with thoracoplasty is being employed more frequently.
4. No collapse therapy or resection is undertaken without a preliminary bronchoscopy.
5. Primary thoracoplasty is preferred in unilateral apical tuberculosis if associated with definite cavitation. But in more widely scattered disease an artificial pneumothorax is preferred with streptomycin cover, or a pneumoperitoneum with or without streptomycin.
6. In minimal lesions bed rest is advised; if the disease shows evidence of extension on bed rest alone, then streptomycin with or without artificial pneumothorax or pneumoperitoneum is used.
7. Pneumoperitoneum has been used more extensively during the past four years, usually without phrenic interruption. The indications are as follows: (a) as supportive or preliminary to thoracoplasty, (b) as a safer measure than artificial pneumothorax in very ill patients, (c) as an aid in obliterating

the pleural space after abandonment of pneumothorax, (d) after lobectomies or decortication operations.

8. Pulmonary resection. This operation is now performed more frequently, the indications being; (a) lower lobe cavity where minor collapse therapy has failed; (b) bronchial stenosis with atelectasis and persistent active disease in the collapsed area; (c) tuberculous bronchiectasis with persistently positive sputum; (d) small isolated lesions impossible to control by collapse; and (e) unstable tuberculoma. To this list of indications were recently added disease not controlled by thoracoplasty and "destroyed lung."

9. Phrenic paralysis has been used more sparingly than in former years. It may occasionally be an adjunct to pneumoperitoneum or as an aid to artificial pneumothorax or to obliterating the pleural cavity after resection operations.

10. Chemotherapy. Streptomycin has been found valuable in halting the progress of advancing exudative lesions: an invaluable adjunct in extending the scope of surgical intervention, when surgery would not have been undertaken in former years, and as a cover in resection operations to prevent post-operative complications.

The report confirms our own experience that PAS is more valuable when used in combination with streptomycin.

E. R.

MINISTRY OF HEALTH

NATION'S HEALTH IN 1949

In his first report* as Chief Medical Officer of the Ministry of Health, Sir John Charles takes stock of the nation's health in 1949. In relation to Tuberculosis he noted that deaths from all forms of tuberculosis showed a remarkable decline of 10 per cent. from those of 1948, the lowest previously recorded. This decline was due to a reduction of 8 per cent. in deaths from respiratory tuberculosis, compared with 1948, and one of 19 per cent. in deaths from "other forms" of tuberculosis. The latter numbered 2,356 in 1949, a drop of 539 (18.6 per cent.) on those in 1948, or 1,725 (42 per cent.) less than those in 1939. At a conservative estimate, 30 per cent. of these deaths from other forms of tuberculosis are due to infection by bovine strains of the tubercle bacillus, conveyed by milk. In this country some 80 per cent. of liquid milk is now heat-treated, and heat treatment of the remaining 20 per cent. would still further reduce these deaths from other forms of tuberculosis.

The long waiting list for institutional treatment continued to be the most urgent problem during the year under review (since 1949 the numbers on the waiting lists have started to fall), the lack of staff still being the major cause of the shortage of accommodation (page 98).

The importance of finding the primary infective case by contact examination is emphasised, the chronic ambulant infectious patient presenting an important problem.

More than 1,200,000 persons were examined in 1949 by *mass miniature radiography*, bringing the total since October 1943 to over four million, 95 per cent. having no abnormal chest condition. Previously unsuspected but active tuberculosis of the lungs has been found in less than 4 per 1,000—i.e., some 16,000 cases in six years. Mass radiography also reveals other chest abnormalities, such as intrathoracic malignant disease, while they are still amenable to treatment.

* Cmd. 8343: Report of Ministry of Health for year ended March 31, 1950, Part II, on State of Public Health, being Annual Report of Chief Medical Officer for 1949. H.M. Stationery Office, price 6s.

NOTICES

MINISTRY OF HEALTH

THIRD ANNIVERSARY OF HEALTH SERVICE

ADDRESSING the Association of Hospital Matrons at Westminster on June 30, 1951, Mr. Hilary Marquand, Minister of Health, said:

"In a few days' time the National Health Service will celebrate its third anniversary. The Service has successfully survived all hazards. It has also shown remarkable resilience and every sign of lusty growth.

"Three years is not long enough to accomplish all that we hope to achieve. But the foundations have been securely laid and considerable progress made in building the superstructure.

"On the hospital side, the number of full-time nurses of all grades in England and Wales has increased from about 111,000 at the inception of the Service to over 130,000 at the end of last March, and the number of part-time nurses during the same period has increased from 16,500 to 25,000. As a result it has been possible both to increase the number of staffed beds by over 22,000—or nearly 5 per cent. of the total—and to reduce the working hours of many nurses who had hitherto been overburdened. An overburdened nurse cannot do her job properly. A happy nurse can do almost as much for a patient as the most skilful surgeon.

"The number of domestic staff in hospitals has also increased considerably—by 7,000 whole-time workers and nearly 10,000 part-timers. This, too, makes it easier to ensure that the nurse is kept wholly for her proper work.

"Let me make it clear once again that though funds are scarce there will be about £20,000,000 more to spend on the hospital service this year than was spent last year. If we eliminate waste at every point it will still be possible not only to maintain standards but to make advances in this difficult year. Let us be partners together in the effort."

The Minister also mentioned that a small Working Party—on which several practising matrons had agreed to serve—had recently been set up to advise on the "very complex question" of what standards should be adopted in fixing hospital nursing establishments. "Despite all the complexities involved, I hope," added Mr. Marquand, "that they will give us useful guidance on the staffing of the main types of wards and departments, not overlooking, of course, the needs of the patient. That is an example of the joint consultation which I want to see developed at every point in the Health Service."

N.A.P.T.

Handbook of Tuberculosis Activities in Great Britain and the Commonwealth (13th Edn. 1950, pp. 370, 30s.)

We have received this very complete directory of hospitals, sanatoria and clinics, Regional Hospital Boards and Hospital Management Committees, and of the Tuberculosis Services in the British Commonwealth, except in-

formation concerning Pakistan, edited by Dr. Harley Williams, with the assistance of Mr. H. F. Hughes and Miss Elizabeth Harrison, which is now brought up to date. The preface contains an account of the old tuberculosis service and details the changes which have taken place since the advent of the National Health Service.

The detailed and comprehensive information which it gives is fully representative and should serve as an invaluable guide to all those interested in the developments of the Tuberculosis Service.

N.A.P.T. UNITED KINGDOM ESSAY PRIZE

THE National Association for the Prevention of Tuberculosis has pleasure in announcing that the prize of 100 guineas offered for the best essay on the control of tuberculosis in the United Kingdom, by chest physicians of not more than ten years' standing, has been awarded to Dr. W. H. Tattersall, Chest Physician at Bournemouth. The prize will be presented to Dr. Tattersall at the N.A.P.T. Council meeting on October 4.

Dr. P. G. Arblaster (Leamington Spa) and Dr. M. B. Paul (Leeds) were placed second and third in the competition.

MINISTRY OF NATIONAL INSURANCE

MEN SUSPENDED UNDER THE WORKMEN'S COMPENSATION ACTS RE-EMPLOYMENT IN THE COAL MINING INDUSTRY

MEN suspended under the Workmen's Compensation Acts because of pneumoconiosis or silicosis, unaccompanied by tuberculosis, may now take up employment in the coal-mining industry if they are passed by the Silicosis Medical Board as fit to do so. The scheme, which is entirely voluntary, does not apply to men suspended for tuberculosis, pneumoconiosis accompanied by tuberculosis, or silicosis accompanied by tuberculosis.

By Regulations* which come into operation on June 4, men passed as fit who take up work underground, or in a surface job involving the working or handling of any minerals taken out of the mine, will be able to claim a modified disablement pension under the Industrial Injuries Scheme if their condition gets worse. They will be examined by a Pneumoconiosis Medical Board before entering employment and will in any case be called up for further examination from time to time. The amount of any disablement pension will be based on the difference between the assessment of disablement given at the first examination and any increased assessment given at a later examination after taking up work. The men may also be able to qualify for special hardship allowance, unemployability supplement, constant attendance allowances and hospital treatment allowance.

An application by a suspended man to take up work in the coal-mining industry should be made on the form attached to leaflet N.I.61, which gives further information and can be obtained at any local National Insurance Office.

* National Insurance (Industrial Injuries) (Prescribed Diseases) Amendment (No. 3) Regulations, 1951, S.I. 1951, No. 918, price 2d.

ESSAY AWARD

THE Board of Regents of the American College of Chest Physicians offers a cash prize award of two hundred and fifty dollars (\$250.00) to be given annually for the best original contribution, preferably by a young investigator, on any phase relating to chest disease.

The prize is open to contestants of other countries as well as those residing in the United States. The winning contribution will be selected by a board of impartial judges and the award, together with a certificate of merit, will be made at the forthcoming annual meeting of the college. Second and third prize certificates will also be awarded.

All manuscripts submitted become the property of the American College of Chest Physicians and will be referred to the editorial board of the college journal, *Diseases of the Chest*, for consideration. The college reserves the right to invite the winner to present his contribution at the annual meeting. Contestants are advised to study the format of *Diseases of the Chest* as to length, form and arrangement of illustrations, to guide them in the preparation of the manuscript.

The following conditions must be observed:

- (1) Five copies of the manuscript, typewritten in English, should be submitted to the executive office, American College of Chest Physicians, 112, East Chestnut Street, Chicago 11, Illinois, not later than April 1, 1952.
- (2) The only means of identification of the author or authors shall be a motto or other device on the title-page, and a sealed envelope bearing the same motto on the outside, enclosing the name of the author or authors.

